BIBLIOGRAPHY OF Technical Reports

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BIBLIOGRAPHY OF Technical Reports

April 17, 1953 Vol. 19, No. 4

CHEMICALS AND ALLIED PRODUCTS

Detergents

Germicidal rinse in dish-washing. Harvard University. Division of Engineering Sciences. Final report covering work done during period 23 Jun 1950 to 31 Aug 1951 under Contract DA44-109-qm-193, by Gordon M. Fair and Shih L. Chang. Sep 1951. 118p graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $3.00. PB 111081

1. Dish-washing - Detergents 2. Detergents - Bactericidal activity 3. Chlormelamine (Trade name) 4. Dactin (Trade name).

Agricultural Chemicals

Persistency of insecticidual residues on various surfaces, a literature survey prepared by Francis D. Horigan and Florence H. Cozzi. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Laboratories. Technical Library. Jul 1952. 24p Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D.C. $.75. PB 111091

Literature published from 1946 to 1952 is covered. Abstracts are arranged alphabetically by author. The exceptions to this are: (1) U. S. Government publications are listed by issuing agency, and (2) Articles with no author are listed alphabetically by title. QMC TL BS 23.

Plastics and Plasticizers

Improvement of plastic laminates and studies related thereto. Bjorksten Research Laboratories, Madison, Wisconsin. Under Contracts AF33(038)-12653 and AF33(028)-30553.

Report for Jun 10, 1950-Jun 10, 1951, by Johan Bjorksten, Luther L. Yaeger, Robert J. Roth. Jun 1951. 306f photos, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.00, Enlargement Print $41.25. PB 108420

1. Plastics, Laminated - Properties 2. Plastics, Laminated - Tests 3. Plastics, Methacrylic 4. Plastics, Heat resistant - Preparation 5. Plastics, Radioactive - Preparation 6. Plastics - Materials 7. Plastics - Research 8. Plasticizers - Evaluation 9. Polyvinyl butyral - Additives 10. Polyurethans - Properties.

First monthly progress report, supplemental agreement no. 2 (52-1491) for the period Dec 10, 1951-Jun 10, 1952, by F. B. Korsgard. Jan 1952. 24p photos, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108421

Laminates have been prepared for evaluation with Nylon DV-55 interlayers. The tensile strengths at 90°C. of these interlayer films, plasticized with 30% benzyl alcohol and cross-linked with 1% salicylic acid, have been as much as 5000-7000 psi.

Paints, Varnishes and Lacquers

Investigation of electrodeposited alloys and pure metals as substitutes for zinc and cadmium for protective finishes for steel parts of aircraft. Battelle Memorial Institute, Columbus, Ohio. Fifth progress report under Contract no. AF33(038)-8750, Jun 23 to Aug 23, 1950, by A. B. Tripler, Jr., John A. Gurklis, and C. L. Faust. Aug 1950. 14p fold tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108635

Electrodeposited alloys and pure metals are being investigated as substitutes for zinc and cadmium for protective finishes for steel parts of aircraft. Attempts to improve the corrosion resistance of zinc-silver diffusion coatings and work on manganese-tin diffusion coatings and manganese-zinc diffusion coatings are described. Corronized specimens (zinc-

nickel alloy) of three compositions were tested in the "wet-dry" cabinet. The corrosion resistance of these alloys appeared to be proportional to the nickel content, and showed no advantage over zinc or cadmium in the "wet-dry" test. Pages numbered 83-94. For 1st-4th reports see PB 108631-108634.

Painting asbestos cement. Gt. Brit. Ministry of Works. 1952. 6p table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.10. PB 108617

1. Cements, Asbestos - Painting - Gt. Brit. 2. MOW AL 28.

Pavement-marking materials, presented at the thirty-first annual meeting, January, 1952. Highway Research Board. 1952. 135p photos, map, graphs, tables Available from Highway Research Board, National Research Council, 2101 Constitution Ave., N. W., Washington 25, D. C. $1.80. PB 108526

National Research Council. Publication 239. Contents: Traffic paint development in California, by L. D. Botts. - Physical properties of traffic paints, by A. C. Peed, Jr. Review of traffic-paint research, by Fred H. Baumann. - Principles of glass-bead reflectorization, by B. W. Pocock and C. C. Rhodes. - Thermoplastic striping compounds, by C. J. Keese and Fred J. Benson. - Traffic paint tests, by W. G. Vannoy. - Road tests of traffic paints, by Francis G. Smith. - Application of plain and beaded traffic paints, by Carl E. Minor and Lowery W. Cody. - Field studies of traffic paints, by Tilton E. Shelburne, A. L. Straub and R. L. Sheppe. - Performance test: Pavement marking materials, by Robert A. Burch. - Annotated bibliography.
1. Paints, Traffic - Development 2. Paints, Traffic - Properties 3. Paints, Traffic - Research 4. Paints, Traffic - Tests 5. Road markers, Fluorescent 6. Road markers, Glass-bead - Reflectorization 7. Road markers, Glass-bead - Tests 8. Pavements - Thermoplastic striping compounds 9. Pavements - Marking materials 10. Pavements - Traffic tests 11. Roads - Thermoplastic striping compounds 12. Traffic surveys 13. Compounds, Thermoplastic striping 14. Materials, Pavement marking 15. HRB BUL 57.

Relative detectability of red-purples, reds, and yellow-reds in air-sea rescue, by Mary S. Secton, Florence L. Malone and Dean Fransworth. U. S. Navy. Medical Research Laboratory. Naval Submarine Base, New London, Conn. Mar 1952. 17p col. photo, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108292

This study investigated the relative threshold visibility of a graduated series of light red-purples, reds and yellow-reds (from 5 RP 6/6 and 6/10 to 10 YR 6/6 and 6/10), unmodified by atmospheric attenuation. Observations were made outdoors in sunlight at distances of thirty-five to one hundred and ninety feet. The test colors were 1/4" circles mounted on blue-grey boards representing the color of the ocean under two different weather conditions. Colors within the range of reds (10 RP to 10 R) proved more visible than other colors of the same brightness and chroma. Colors displayed against darker backgrounds were detected at much greater distances than when they were displayed against lighter backgrounds of similar contrast ratios. The effect of factors other than hue which should be considered in the selection of colors for maximum visibility under search conditions at sea are discussed. Bureau of Medicine and Surgery, Navy Department, Project NM 003 041.35.02. Medical Research Laboratory Report no. 195, Volume XI, no. 12. Color in photo will not reproduce. NAV MRL 195.

Miscellaneous Chemicals

Absorption line width in the infrared spectrum of atmospheric carbon dioxide, by Arthur Adel. Arizona State College, Flagstaff, Ariz. Nov 1952. 24p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108582

The technique of oblique incidence provides the narrow slits necessary in the direct observation of line width. Correction for the finite width of slit influence. The average absorption coefficient half-width at half-weight for the rotation-vibration lines in the 15 micron band of atmospheric carbon dioxide is 0.12 cm^{-1}. Scientific report HA-4 on Contract no. AF19 (122)-198.

Compounds of silicon and germanium, by F. Seitz. Jun 1942. 12p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108182

May not reproduce well.
1. Germanium compounds 2. Silicon compounds.

Decomposition of benzoyl peroxide in the presence of nitrate esters, by Frederick Kaufman and Verna Flora. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Dec 1951. 9p drawing, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108553

Project no. TB3-0110 of the Research and Development Division, Ordnance Corps.
1. Nitrates - Esters - Uses 2. APG BRLR 789.

Development of high temperature, light-weight, insulating material for jet engine tail cones, by W.F. O'Connor, T. S. Laszlo, J. R. Killelea, N. V. Sussman, T. G. Bullen, J. M. Katz, J. P. Sheehy. Fordham University. Dept. of Chemistry, New York, N. Y. Sep 1950. 69p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 108152

A high-temperature lightweight insulating material has been prepared. The material is porous mullite produced by firing a dried air-foamed kyanite slurry. A rapid thermal conductivity comparator has been developed. The time required for an average run is six hours. Hot face temperatures of 2300°F are easily reached using city gas and oxygen. A novel method for the calculation of thermal diffusivity from the thermal conductivity data is tentatively proposed. These properties, together with the bulk density, permit calculation of the specific heat. Progress report no. 7 under Contract no. AF-33 (038)7371 (Final report).

Fine structure of the magnetic resonance line of protons in $CuSo_4$ - 5 H_2 O, by N. Bloembergen. Harvard University. Cruft Laboratory. Aug 1949. 24p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108469

1. Protons - Magnetic moments 2. Copper sulfate pentahydrate ions - Interactions 3. Leiden. Rijksuniversiteit. Kamerlingh Onnes Laboratorium 4. HU CL TR 87.

Heavy chemicals. Anglo-American Council on Productivity. Report of a productivity team representing the British heavy chemical industry which visited the United States of America in 1952. Jan 1953. 92p diagr, fold map, fold graph, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.75. PB 106467

1. Chemical industries 2. Chemical plants 3. Labor and laboring classes.

X-ray studies of simple hydrogen-bonded crystals with freezing points below room temperature. I: Crystal structure of formic acid. II: Crystal structure of isocyanic acid, by Gene B. Carpenter and Werner C. von Dohlen. Brown University. Metcalf Research Laboratory, Providence, R. I. Nov 1952. 12p Available from Library of Congress, Publication Board Projcet, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108627

A partial study of the crystal structure of formic acid has been made. The structure determination will not be continued because similar work has been completed by Holtzberg, Post, and Fankuchen. The results of the present investigation are in agreement with their results. Annual report no. 1 under Contract Nonr-562 (04) NR-017-607. Summary for period 1 Sep 1951-1 Sep 1952.

ELECTRICAL MACHINERY

Communication Equipment

Absolute calibration of hydrophones by different methods in the frequency range of 0.1 to 10 kc/s, by K. Tamm and others. 1950. 40p photo, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108179

Translation of III Physikalisches Institut der Universität, Göttingen, 1950. Sponsored research (Germany) Report no. 4 (Series B). No German title given.
1. Hydrophones - Calibration - Germany 2. Hydrophones, Piezoelectric - Calibration - Germany 3. Hydrophones, Tourmaline - Calibration - Germany 4. Sound, Underwater - Measurements - Germany 5. Receivers, Piezoelectric - Calibration - Germany 6. Receivers, Electroacoustic - Calibration - Germany 7. Circuits, Electromechanical - Germany 8. Göttingen. Universität. Physikalisches Institut 9. DSIR SR 4, series B.

Ionospheric absorption of obliquely incident radio waves, by Alan T. Waterman, Jr. Harvard University. Cruft Laboratory. Mar 1952. 122p photos, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.00, Photostat $16.25. PB 108535

Signal-strength measurements on the individual pulses in an arriving wave-train after transmission over a 1309-km path at 12.9 Mc/s are interpreted, through application of ray theory, in terms of the absorption suffered in the ionosphere. Equipment constructed for the purpose is described, and the records obtained are presented and analyzed. The variation of received pulse amplitudes with critical frequencies of the inospheric layers is adequately explained in terms of ray-theory computations. Implications regarding the frequency of electron-molecule collisions in the inosphere, and the effective cross section for such collisions, are then discussed with reference to other measurements. Contract N5ori-76, Task order no. 28, NR-071-011. HU CL TR 143.

Ray theory applied to a spherical inosphere, by Alan T. Waterman, Jr. Harvard University. Cruft Laboratory. Feb 1952. 110p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.50, Photostat $13.75. PB 108534

Contract N5ori-76, Task order no. 28, NR-071-011.
1. Inosphere - Research 2. Radio waves - Propagation - Curves 3. Radio waves - Propagation - Inospheric 4. HU CL TR 142.

Relative reliability of five types of telegraph systems, by F. R. Eldridge. Johns Hopkins University. Institute for Cooperative Research, Baltimore, Md. Jul 1949. 39p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108628

Contract N6onr-243.11. Report PRU 118.
1. Telegraphy.

Analysis and calibration of loop probes for use in measuring interference fields, by G. A. Morgan, Jr. U. S. Naval Research Laboratory. Jun 1949. 56p diagrs, graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.50. PB 111046

A small shielded-loop antenna, to be used as a probe for indicating and measuring radio-frequency interference fields from electrical equipment, has been analyzed. A method of calibration, which uses another small shielded loop to establish a radio-frequency field of known characteristics, has been developed, and its accuracy and reliability are proved experimentally. Loop probes of the approximate dimensions of those analyzed have been shown to be usable for the desired application at frequencies below approximately 400 Mc only, both because of unsatisfactory response characteristics and because of difficulties of calibration at higher frequencies. NRL R 3486.

Coupled receiving antenna II, by Clement Moritz. Harvard University. Cruft Laboratory. Mar 1952. 79p photos, drawings, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.50, Photostat $10.00. PB 108539

The material in this report deals specifically with the experimental equipment and the methods used to make measurements of the behavior of two coupled receiving antennas. Basically the method of measurement is straightforward, being simply an adaptation of single-cylinder practice, so that results can be obtained from two antennas simultaneously. Explanations are made of the governing factors underlying the particular arrangement of apparatus chosen in terms of the available circumstances. These circumstances greatly determined the design and placement of the antennas and their accompanying equipment. This equipment is discussed in detail. Explanations are given for the choice and design of particular components. This apparatus seems to be new to experimental antenna work, and it has been well suited and easy to use for this type of service. For Part I see PB 108538. Contents: IV. Experimental methods and measuring equipment. HU CL TR 147.

Coupled slot antennas, by George W. Wheeler. Harvard University. Cruft Laboratory. Oct 1950. 122p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.00, Photostat $16.25. PB 108496

The problem of the coupling between two slots located in the same infinitely large, infinitely conducting plane is considered. A theoretical analysis has been carried out subject to certain approximations, and an experimental verification of the theory has been obtained. It is shown that certain approximations are valid in the quasi-far-zone. An important by-product of the investigation is the demonstration of the fact that Babinet's principle may not be used indiscriminately in electromagnetic problems. Contract N5-ori-76, Task order no. 1, NR-078-011. HU CL TR 104.

Crosscorrelation functions of amplitude-distorted Gaussian signals, by Julian J. Bussgang. Massachusetts Institute of Technology. Research Laboratory of Electronics. Mar 1952. 15p diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108434

This report treats the crosscorrelation functions of gaussian signals. It is shown that the crosscorrelation function of two such signals taken after one of them has undergone a nonlinear amplitude distortion is identical except for a factor of proportionality to the crosscorrelation function taken before the distortion. Possible practical applications of this property are indicated. A number of correlation functions associated with some of the most common types of distortion are computed. Contract no. DA-36-039-sc-100. Dept. of the Army project no. 3-99-10-022. Signal Corps project no. 8-102 B-0. MIT RLE TR 216.

Diffraction by spheres and edges at 1.25 centimeters, by C. Huang and R. D. Kodis. Harvard University. Cruft Laboratory. Nov 1951. 25p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108531

Measurements have been made, using an image-plane technique, of the diffraction near conducting spheres whose radii are comparable to a wavelength and near the edge of a conducting half-plane. Measured distributions of both the phase and amplitude of the electric field were obtained for two self-resonant spheres and for one sphere having a radius corresponding to a relative maximum of the back-scattering cross section. In one case the measurements are compared with the theory and are found to be in good agreement. With the diffracting edge such a comparison shows that considerable error is introduced by the point source. However, the substitution of the equivalent of a line source once again brings the measurements into close agreement with the theory. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 138.

Experimental and theoretical results on the back-scattering cross section of coupled antennas, by J. Sevick. Harvard University. Cruft Laboratory. May 1952. 29p diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108542

This paper presents the theoretical and experimental results of the back-scattering from two coupled antennas. The theoretical development was presented in Technical Report No. 149. In order to provide a basis for comparison, results are also given for the single antenna case. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 150.

Experimental method of measuring back-scattering cross sections of coupled antennas, by J. Sevick. Harvard University. Cruft Laboratory. May 1952. 35p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108543

This paper presents a new method of measuring back-scattering cross sections. The measuring scheme utilizes an image-plane and cancellation procedure. With this method measurements are made individually on both the incident and scattered signals. The system offers a means of obtaining quick experimental results with a knowledge of the errors involved. The method is limited, as are all image-plane techniques, to obstacles containing a plane of symmetry. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 151.

General theory of plane-wave scattering from finite conducting obstacles with application to the two-antenna problem, by J. Sevick and J. E. Storer. Harvard University. Cruft Laboratory. Apr 1952. 58p diagrs, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 108541

Contract N5ori-76, Task order no. 1, NR-078-011. 1. Waves, Electromagnetic - Scattering 2. Waves, Electromagnetic - Theory 3. Equations, Integral 4. Antennas, Coupling - Radiation patterns 5. HU CL TR 149.

Method of Wiener in a nonlinear circuit, by Shikao Ikehara. Massachusetts Institute of Technology. Dec 1951. 23p diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108435

This report gives an expository account of a method due to Wiener. His method is to solve for the voltage across a nonlinear device in terms of the entire random voltage and then to get statistical averages, on the assumption that the current-voltage function of the nonlinear element and the system transfer function are given. We treat a case in which random voltage passes through a filter before entering the circuit in question. Explicit formulas depending only on the assumptions above can be given for the moments of all orders of the voltage across part of the circuit, and similarly, for its frequency spectrum. The method of computation explicitly requires the use of the Wiener theory of Brownian motion, also associated with the names of Einstein, Smoluchowski, Perrin, and many others. Sections I and III form the main part of the paper; section II is an heuristic exposition of the Wiener theory of Brownian motion preparatory to section III. Contract no. DA-36-039-sc-100. Dept. of the Army project no. 3-99-10-022. Signal Corps project no. 8-102 B-O. MIT RLE TR 217.

Microwave diffraction measurements in a parallel-plate region, by R. V. Row. Harvard University. Cruft Laboratory. May 1952. 62p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 108545

Many electromagnetic scattering problems consisting of plane or cylindrical wave incident on an array of periodically spaced identical obstacles may be simulated experimentally by placing one or more of the obstacles between a pair of parallel, infinite and perfectly conducting planes and illuminating the obstacles with a plane or cylindrical wave confined to the parallel-plate region. Such an experimental arrangement has been constructed for use in the 3-centimeter wavelength region. The finite parallel plates support a transverse electromagnetic wave with the electric field normal to the plates. Absorbing wedges at the outer boundary of the plates reduce reflections from these boundaries. The scattered fields may be investigated by means of a dipole penetrating into the region. The equipment has been used to measure the total field scattered by conducting wedges of angles 0, 45 and 90 degrees. Agreement with theory is good. The effect of finite thickness of the diffracting screen (for the 0^{o} wedge) in increasing the amplitude of the scattered wave is noted and compared to theoretical results derived for scattering from a conducting half-plane with a cylindrical edge. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 153.

Microwave research. Duke University. Dept. of Physics. Quarterly progress report, July 1, 1952-Sep 30, 1952, under Contract no. AF19(604)-258, by Walter Gordy. Sep 1952. 50p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 108313

Contents: Electric dipole moments of several molecules from the Stark effect, by S. N. Ghosh, Ralph Trambarulo and Walter Gordy. - Possible microwave absorption in the molecules be ongoing to the point groups $D_{2d} \cong V_d$ and T_d, by Venkateswarlu Putcha and Masataka Mizushima.
1. Radio waves - Research 2. Radio waves - Absorption 3. Dipoles, Electric 4. Molecules - Spectroanalysis 5. Stark effect.

Off-axis characteristics of the paraboloidal reflector, by K. S. Kelleher and H. P. Coleman. U. S. Naval Research Laboratory. Dec 1952. 48p diagrs, graphs (part fold), tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.25. PB 111099

An investigation was made of the off-axis characteristics of paraboloidal and spherical reflectors. For the paraboloid, a first approximation expression was derived which related the beamwidths of scan to the antenna parameters. Experimental data were taken on pattern characteristics for reflectors of fixed D/λ with various values of f/D and illumination taper. Other measurements included evaluation of cross-polarization patterns and positioning of the feed horn. An analytical expression, together with experimental data, was obtained for the

beam factor. Finally, sufficient measurements were made on spherical reflectors to permit a comparison of the off-axis qualities of the paraboloid and sphere. NRL R 4088.

On the magnetic resonance absorption in conductors, by N. Bloembergen. Harvard University. Cruft Laboratory. Jun 1952. 29p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108547

The electromagnetic losses in conductors are analyzed in terms of magnetic absorption and conduction losses. The quantities observed in a magnetic resonance experiment have a different meaning depending on whether the dimensions of the sample are large or small compared to the skin depth. Explicit formulas for electric and magnetic losses are given for the case of a plane sheet and a sphere. The influence of the conductivity on the line shape and saturation effects is discussed both for nuclear and ferromagnetic resonance. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 156.

Production of millimeter waves by spark discharges, by F. R. Dickey, Jr. Harvard University. Cruft Laboratory. Jul 1951. 105p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.50, Photostat $13.75. PB 108513

An experimental investigation of a new method of producing millimeter wave spark oscillations, that of discharging charged mercury droplets to a grounded plate, has been carried out. A jet of drops which are caused to form at an audio frequency rate has been used. The jet has been formed in a gas, in a liquid, and in an evacuated system. The spectrum radiated in the wavelength range of two to nine millimeters has been investigated using a diffraction grating and a silicon crystal detector. The center wavelength of the radiated spectrum is about seven times the drop diameter and the width of the spectrum is roughly 0.7 of the center value. The spark between the drop and the plate is found to occur when the drop is extremely close to the plate. The average power output is low although the efficiency of radiation appears to be reasonably high. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 123.

Progress report for Jul-Sep 1952. National Research Council of Canada. Radio and Electrical Engineering Division. Oct 1952. 16p photo, map, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. Limited supply available from National Research Council of Canada, Ottawa, Canada. PB 108150

1. Dielectric research - Canada 2. Navigational aids - Canada 3. Tubes, Electron - Research - Canada 4. Noise, Solar - Measurement - Canada 5. Electromedical research - Canada 6. NRCC ERA-236.

Radiation of the boss antenna, by Charles H. Papas and Donald B. Brick. Harvard University. Cruft Laboratory. Apr 1952. 21p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108540

The boss antenna consists of a conducting hemisphere placed over an image plane. The center conductor of the coaxial line which drives the radiator is continuous with the hemisphere while the outer conductor continues as the image plane. The gap, or radial transmission line, between the hemisphere and the plane is narrow so that one can assume that the field distribution across the gap has the form of a Dirac delta-function. Use is made of the image theorem in deriving the expression for the radiation field and hence the radiation from the resulting spherical antenna is arrived at from a series expansion in spherical harmonics. This problem differs from that treated by Stratton in that Stratton considers the free oscillations of the sphere while this paper deals with the driven case. The expression for the radiation pattern herein derived is qualitatively verified by experiment. The apparatus is described as well as the techniques used in measurement. Contract N5-ori-76, Task order no. 1, NR-078-011. HU CL TR 148.

Research and development on improved microwave surfaces. Armour Research Foundation, Chicago, Illinois. Report no. 15 (final) under Contract no. W-36-039-sc-44508, by William H. Colner and Howard T. Francis. Sep 1950. 41p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 108599

Army project no. 3-99-15-022. Signal Corps project no. 32-152B. Supplement is Revised tentative recommendations for silver plating of waveguides.
1. Wave guides - Materials - Research 2. Wave guides - Silver plating 3. Silver plating 4. Tellurium-copper alloys 5. ARF Proj 90-720B, Report no. 15 (Final).

Thermal evaluation of air-cooled electronic equipment, by Walter Robinson and R. H. Zimmerman. Ohio State University Research Foundation, Columbus, Ohio. Sep 1952. 411p photos, diagrs, graphs (part fold), tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $10.50. PB 111106

Air-cooled electronic equipments designed for airborne application are classified according to their cooling methods. Basic thermal test methods and techniques of making the necessary measurements are described with emphasis on bench testing. Calculation methods for the prediction of altitude chamber test data and calculation methods for their correction are discussed for equipments which cannot be evaluated by bench tests only, and for other altitude chamber test. Methods applicable to various types of equipment for evaluation of non-steady state operation are covered in detail. One chapter is devoted to the theory, performance, evaluation and selection of cooling blowers. Throughout the report,

charts are presented which allow graphical means to be utilized to a great extent for purposes of analysis. All methods are illustrated by means of examples listed in the Contents. Physical property data, air flow theory, blower test methods and details of experimental apparatus are presented in the appendices. Contract no. W33-038-ac-14987. AAF TR 6579.

Wave propagation in a two-dimensional periodic medium, by James E. Storer. Harvard University. Cruft Laboratory. May 1952. 42p diagrs, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 108544

An approximate solution to the problem of propagation of electromagnetic waves in a two-dimensional array of perfectly conducting cylinders is presented. The method used to obtain a solution is similar to that employed by Levine and Schwinger in diffraction problems. Thus, an integral equation is derived for the currents flowing on the cylinders, and than a variational principle is used to obtain an approximate solution to this equation. This method can be generalized to three-dimensional periodic arrays if desired. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 152.

Generators, Motors, Transmission

Ceramic dielectric, fixed feed thru capacitors. Sprague Electric Co., North Adams, Mass. Final report under Contract AF33(038)-16339. Apr 1952. 21p drawings (1 fold), graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108221

This contract has been concerned with the development of a feed-through type ceramic capacitor which would possess improved mechanical and physical properties when compared to the presently available type used in feed-through applications for aircraft communications and control equipment. The feed-through capacitor possessing improved characteristics was successfully developed using a disc-type ceramic capacitor element housed in the enlarged nut portion of the metal housing. End seals were made with a special resin formulation which is satisfactory for use despite the relatively high pressures developed when weight is applied to the feed-through terminal wires. The design was found to be suitable for any appropriate ceramic element and with proper selection of ceramic thickness, it is possible to secure desired voltage ratings in capacities up to 1500 mmfd. and the standard capacitor size.

Development of subminiature high temperature capacitors. Balco Research Laboratories, Newark, N.J. Third quarterly progress report for period ending 11 Oct 1952 under Contract no. AF33(038)-17190, supplementary agreement no. 1, prepared by H. Mack Thaxton. Oct 1952. 39p drawing, diagr, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108223

For 2d report see PB 107358.
1. Capacitors, High temperature - Subminiature 2. Capacitors, Plastic dielectric 3. Teflon - High frequency resistance 4. Films, Plastic - Dielectric properties.

Final report under Contract 11-439 OEMsr-934, for period Mar 1943 through Jun 1945. Pennsylvania. University. Central Engineering Laboratory. Jun 1945. 643p photos, diagrs, drawings (part fold) graphs, tables Available from Library of Congress Publication Board Project, Washington 25, D. C. Microfilm $9.00, Photostat $81.25. PB 108107

Contents: General summary. - Sec. A. High pressure oxygen generators. Project M-12. Oxygen generators for shipboard use, liquid (14 lb. per hour) by N. A. Spector. - Project M-31. Le Rouget type oxygen generator, liquid (50 lb. per hour) by N. A. Spector. - Sec. B. Low pressure oxygen generators. Project M-3. Air-borne oxygen generator, gas (350 cu. ft. per hr.) by G. Lund. - Project M-5. Low pressure pilot plant oxygen generator for submarine application, liquid (400 lb. per hour) by W. E. Catterall. Project M7AT. Airtransportable oxygen generator, gas (650 cu. ft. per hour) by G. Lund. - Project M-27. Low pressure pilot plant oxygen generator, gas, by N. A. Spectro. - Section C. Chemical oxygen generators. Project C-3. Apparatus and methods for generation of oxygen from alkali peroxides by S. S. Prentiss. - Project C-11. Shipboard-type case chemical oxygen unit, by T. A. Geissman. - Section D. Submarine air conditioning. Process for the removal of carbon dioxide from the atmosphere of a submarine, by A. P. Colburn and B. F. Dodge. - Project S-1. Removal of carbon dioxide from submarine atmosphere by sea water scrubbing, tower type, by N. A. Spector. - Project S-1J. Removal of carbon dioxide from submarine atmosphere by sea water scrubbing jet type, by N. A. Spector. - Project S-2. Removal of carbon dioxide from submarine atmosphere by ethanolamine scrubbing, by W. E. Catterall. - Section E. Purification of air. Project X-1-CO. Catalytic oxidation of acetylene and other hydrocarbons, by T. A. Geissman. - Projects X-4 and X-14. Removal of carbon dioxide from high pressure air by solid absorbents, by T. A. Geissman. - Project X-15. Deposition of carbon dioxide from air stream by direct cooling, by W. L. McCabe and D. C. Reams, Jr. Project X-16. Dew points of carbon dioxide-air mixtures, by T. A. Geissman. - Section F. Equipment studies. Project X-5. Heat exchanger problems, by N. A. Spector. - Project X-6. Liquid oxygen vaporizers and walk-arounds, by S. S. Prentiss. - Project X-10. Development of turboexpanders, by J. S. Swearingen and W. E. Catterall. - Project X-11. Performance tests on Kellogg type-J fractionation tray, by W. E. Catterall. Project X-13. Apparatus and methods for oxygen analyses, by D. C. Reams, Jr. - Section G. Miscellaneous. Project M-1. Mobile high pressure oxygen generator, gas, by N. A. Spector - Project M-4. Giauque mobile high pressure oxygen generator, liquid, by N. A. Spector. - Project M-6. Intermediate pressure pilot plant oxygen generator for submarine application, liquid (430 lb. per hout), by G. Lund. - Project M-11.

Keyes high pressure oxygen generator, liquid (35 lb. per hour) by N. A. Spector. Project M-13. Collins air-borne oxygen generator, gas, by G. Lund. - Project X-9. Lysholm rotary air compressor, by G. Lund. - Soda lime test apparatus, by D. C. Reams, Jr. and B. Schepartz. - Compact apparatus for determining suitability of oxygen for aircraft use, by S. S. Prentiss.
1. Air - Purification 2. Acetylene - Oxidation 3. Carbon dioxide - Removal 4. Heat exchangers 5. Oxygen - Analysis - Apparatus 6. Oxygen, Liquid - Production - Apparatus 7. Oxygen, Liquid - Vaporizers 8. Oxygen generators 9. Submarines - Air conditioning 10. Turbo-expanders - Design 11. NDRC Div 11 12. OSRD 5482.

Generator set, portable, GED, 30-KW, 120/208-240/416-volt, AC, 3-phase, 400-cycle, 4-wire Hobart model HF-30G (less engine). U. S. Army. Jan 1952. 145p photos, drawings, diagrs (1 fold), table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.75, Photostat $18.75. PB 108608

1. Generators, Portable 2. HF-30G (Generator) 3. WD TM 5-5072.

Study and design of electron tube sockets with removable built-in capacitors. Cinch Manufacturing Corporation, Chicago, Illinois. Third interim engineering report, Jul 7th to Oct 7th, 1952, under Contract no. AF 33(600)8607, by K. A. Woehrer. Oct 1952. 23p drawings, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108308

Designs for Octal, Noval and 7-Pin Miniature tube sockets with removable capacitors have been prepared. Hand made models have been made to cover each design in order to study the physical characteristics and to evaluate the features incorporated. Molded models of the octal socket employing flat capacitors have been made and electrical tests have been performed. Samples of several designs will be submitted to representatives of the contracting officer together with applicable data obtained for examination and comment.

Miscellaneous

Cable, radio frequency, study of power ratings. Interim engineering report no. 3, period Apr 1952 through Sep 1952, under Contract no. AF33(038)-20145, by J. G. Krisilas, W. F. Mrazek, O. A. Mannella. American Phenolic Corporation, Chicago, Illinois. Oct 1952. 68p drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 108222

The study has been divided into three phases--(a) investigation of the thermal constants, (b) power rating of coaxial cables, and (c) theoretical analysis of coaxial cable performance. Experimental and theoretical research has been conducted in all three phases of the subject investigation. The thermal conductivities of the materials used in the design of coaxial cables were determined with the materials in their actual cylindrical shape. The variation of the thermal conductivities of both Teflon and polyethylene coaxial cables and their jacket materials with mean temperatures have been obtained. Values of the surface film coefficients for various diameter cables suspended horizontally in still air are presented. The results of the calibration of the calorimetric water load, calibration of the input and output power meters, modification of the quarter-wave technique for center conductor temperature measurements, improved surface temperature measuring techniques and other techniques are presented in the subject report. An analytical and experimental discussion is presented concerning the relative expansion of Teflon and polyethylene dielectrics compared with the expansion of the center conductor when the power input values approach the power rating of the particular cable. A detailed analysis is presented of the action of the impregnating varnish used in Teflon dielectric coaxial cable construction on the power rating and thermal insulation values.

Correction of electrostatic-deflection cathode-ray-tube recordings to obtain actual signal input, by H. J. Peake and R. W. Rochelle. U. S. Naval Research Laboratory. Dec 1952. 28p diagrs, graphs Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.75. PB 111089

The determination of the true signal waveform applied to an electrostatic-deflection cathode-ray tube requires accurate knowledge of the distortions introduced. The effects of the deflection plates as a transmission-line termination, as well as the effects of transit-time distortion, can be obtained analytically; when combined, the result is an over-all transfer characteristic for the cathode-ray tube. The transfer characteristic permits extraction of the true signal input from known (or measurable) tube parameters and the trace obtained on the screen.

Currents induced on an infinitely long wire by a slice generator, by T. E. Roberts, Jr. Harvard University. Cruft Laboratory. May 1951. 24p diagrs, graphs, tables Available from Library of Congress Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108518

Contract N5ori-76, Task order no. 1, NR-078-011.
1. Transmission lines - Conductance 2. Currents, Electric - Distribution - Theory 3. HU CL TR 129.

Cylindrical antenna center-driven by a two-wire open transmission line, by T. W. Winternitz. Harvard University. Cruft Laboratory. Aug 1948. 68p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 108415

Contract N5ori-76, Task order no. 1, NR-078-011. Condensation of a doctoral dissertation presented to the Dept. of Engineering Sciences and Applied

Physics of Harvard University Feb 1948.
1. Antennas, Cylindrical - Theory 2. Transmission lines - Theory 3. Antennas - Impedance - Theory 4. Equations, Integral 5. HU CL TR 56.

Development and technical evaluation of gas filled electron tubes. Interim report "O" under Contract AF33(616)-248, July 1-Sep 30, 1952, by G. Edelcreek. Chatham Electronics Corporation, Newark, N. J. Oct 1952. 30p diagr, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108440

1. Tubes, Electron - Design 2. Tubes, Electron - Voltage regulator 3. Tubes, Electron - Life tests 4. Tubes, Electron - Miniaturization.

Dynamic range measurements of square-law tube QK-329 at audio, by W. T. Rusch. U. S. Air Force. Electronics Research Division, Cambridge Research Center, Cambridge, Mass. Dec 1952. 13p diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108290

The QK-329 is a tube developed by the Raytheon Manufacturing Company under contract with the Air Force Cambridge Center. The output of the QK-329 is instantaneously proportional to the square of the input. This report describes the work performed in order to determine the extent of the dynamic range of this tube operating as a second-harmonic square-law amplifier. It was found that the tube operation was square law within the accuracy of the measurements over ranges as 102db of output signal.

L-3028 magnetron. Sixth quarterly report, period of 1 July 1952-1 Oct 1952, under Contract no. AF33-(038)-23064, by Herman W. Smith, Jr. Litton Industries, San Carlos, Calif. Oct 1952. 13p fold drawing, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108310

L-3028 Serial No. 10 was built and tested. It meets power output specifications, and with no external corrective means almost meets temperature coefficient specifications. This tube has undergone extensive tests to determine tunability, temperature coefficient, etc. Other tubes are at various stages of construction and exhaust. External stem design has been finalized, and tuner design is nearing finalization.

Obstacle-loaded cylindrical cavities with application to the interdigital magnetron, by Winston S. Lucke. Harvard University. Cruft Laboratory. Nov 1948. 152p photo, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $6.00, Photostat $20.00. PB 108418

Contract N5ori-76, Task order no. 1, NR-078-011.
1. Resonant cavities - Theory 2. Vacuum tubes, Magnetron - Interdigital 3. Maxwell's field equations 4. Waves, Electromagnetic - Radiation 5. Equations, Integral 6. HU CL TR 60.

Positive-grid corrosion in the lead-acid cell: Corrosion rates of tin alloys and the effect of acid concentration on corrosion, by John J. Lander and Jeanne B. Burbank. U. S. Naval Research Laboratory. Nov 1952. 27p photos, graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.75. PB 111088

Corrosion and growth rates of several binary and ternary lead alloys were measured under anodic conditions. An empirical relationship between growth and tensile strength is shown. Binary tin alloys exhibit lower corrosion rates than Ca and Sb alloys, and ternary tin alloys show both less corrosion and smaller growth rates. Positive plate growth is correlated with capacity vs. life data for cells having 8 and 9% antimonial grids. Extension of the principles involved to other alloys should be useful in selecting new alloys for full-scale tests and may enable estimation of battery lift where new alloys are used. Microscopic examination of both etched and corroded specimens of the alloys showed that corrosion topography bears a definite relation to the microstructure of these alloys. The results of weight-loss measurements and microscopic examination of corroded grids from life-tested batteries having electrolytes of different concentration further clarify the concentration effect on corrosion. NRL 4678

Radiation sources for the vacuum ultraviolet. Final technical report under Contract no. AF19(122)-432 covering the period Jan 3, 1951 to Nov 3, 1952, by R.O'B. Carpenter. Baird Associates, Inc., Cambridge, Mass. Nov 1952. 74p photos, drawings (3 fold), diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.50, Photostat $10.00. PB 108294

1. Ultraviolet radiation - Sources 2. Lamps, Ultraviolet - Design 3. Lamps, Xenon 4. Lamps, Hydrogen discharge.

Study of coaxial-line discontinuities using a variational method, by Elmer O. Hartig. Harvard University. Cruft Laboratory. Jun 1950. 31p diagrs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108498

The problem of plane coaxial-line discontinuities has been solved by means of a variational method. The input admittance is obtained in the form of an integral equation which is stationary with respect to small variations about the correct value for the transverse electric-field distribution. The E-field component was then expanded in a complete set of orthogonal functions. To complete the solution the expansion coefficients were obtained by making use of the stationary properties of the admittance. Various types of discontinuities in coaxial lines were

measured, and the agreement between the measured and calculated zeroth-order solutions were found to be good. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 108.

Transmission lines and connectors, high-temperature, liquid-filled for video, RF and pulse applications. Interim engineering report no. 5 for period May-Nov 1952 under Contract no. AF33(038)-11505, by C. C. Camill, J. G. Krisilas, G. J. Mares. American Phenolic Corporation, Chicago, Illinois. Nov 1952. 28p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108438

The work accomplished during this report interval covers the electrical evaluation of liquid dielectric cable constructions, various liquid dielectrics, and the experimental verification of the power rating calculations of Interim Report No. 4 under the subject contract. The electrical evaluation of cable constructions consisted of characteristic impedance measurements of two modified liquid dielectric cables. In the first cable, the filament type center conductor support was replaced by a channeled core. The second cable consisted of a channeled core and rigid outer conductor. The results of the measurements showed that the filament type construction is responsible for large variations in characteristic impedance. The substitution of a rigid outer conductor in place of the flexible outer conductor resulted in a slight improvement over the filament type cable, but no improvement over the flexible channeled core cable. Attenuation measurements using various liquid dielectrics in the channeled core cable proved that the mineral oil still possesses the lowest loss tangent of these dielectrics. The experimental determination of the power rating of the liquid dielectric coaxial cable, undertaken primarily to measure the performance characteristics of the cable and secondly to check the theoretical calculation, was continued during the report interval. The power handling capacities at various oil dielectric flow rates have been obtained versus the center conductor temperature as measured by the quarter wave transformer temperature indicator. Report no. 1422-022.

FOOD AND KINDRED PRODUCTS

Dehydration of green beans, by E. M. Litwiller and L. A. Pettit. Report no. 4 (Annual report) for period covering 1 Jun 1951 to 30 Jun 1952, under Contract DA11-009-qm-10294. U. S. Quartermaster Food and Container Institute. Jun 1952. 3p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108331

Collaborating institution: Oregon. Agricultural Experiment Station. Dept. of Food Technology, Corvallis, Ore. Project no. 7-84-06-028.
1. Beans, Green - Dehydration 2. Oregon. Agricultural Experiment Station, Corvallis, Ore. 3. QMC FCI Contract DA11-009-qm-10294, Report no. 4.

Heat penetration in meat processing, by C. Olin Ball, Richard C. Kennedy and Abner Salant. Report no. 4 (Termination report) for period covering 1 June 51 to 31 May 1952, under Contract no. DA11-009-qm-10595. U. S. Quartermaster Food and Container Institute. May 1952. 5p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108327

Collaborating institution: Rutgers University. New Jersey Agricultural Experiment Station. Dept. of Food Technology, New Brunswick, New Jersey. Project no. 7-84-06-026.
1. Meat, Canned - Heat penetration 2. Meat, Processed - Heat peneteration 3. New Jersey. Agricultural Experiment Station, New Brunswick, N. J. 4. QMC FCI Contract DA11-009-qm-10595, Report no. 4.

Histological and histochemical characteristics of dehydrated meat, by H. R. Kraybill, Hsi Wang, Earl Auerback and Virginia Bates. Report no. 9 (Termination report) for period covering Aug 1, 1951 to July 31, 1952, under Contract no. DA11-009-qm-12990. U. S. Quartermaster Food and Container Institute. Jul 1952. 39p photos, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108326

Collaborating institution: American Meat Institute Foundation. Division of Analytical and Physical Chemistry and Histology. Project no. 7-84-06-026.
1. Meat, Dehydrated 2. American Meat Institute Foundation, Chicago, Illinois 3. QMC FCI Contract DA11-009-qm-12990, Report no. 9.

Mechanisms of chemical changes affecting acceptability of beverage milk products, by D. V. Josephson, F. J. Doan, S. Patton and G. W. Kurtz. Report no. 28 (Termination report) for period covering 1 Sep 1951 - 31 Aug 1952, under Contract no. DA11-009-qm-14006. U. S. Quartermaster Food and Container Institute. Aug 1952. 6p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108328

Collaborating institution: Pennsylvania State College, Dept. of Dairy Husbandry State College, Pennsylvania. Project no. 7-84-06-029.
1. Milk, Dehydrated - Deterioration 2. Milk products - Deterioration 3. Pennsylvania State College. Dept. of Dairy Husbandry, State College, Pa.
4. QMC FCI Contract DA11-009-qm-14006, Report no. 28.

Physiological studies on spore formation and spore germination, by O. B. Williams, W. R. Smith, Donald Lundgren, Carl Heather and Allan Laskin. Report no. 21 (Termination report) for period covering 1 Oct 1951 - 30 Sep 1952, under Contract DA11-009-qm-14008. U. S. Quartermaster Food and Container Institute. Sep 1952. 8p table Available from Library of Congress, Publication

Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108330

Collaborating institution: Texas. University. Dept. of Bacteriology. Project no. 7-84-17-012.
1. Bacteria - Spores - Physiology 2. Food - Deterioration 3. Clostridium nigrificans 4. Clostridium thermosacchardyticum 5. Texas. University. Dept. of Bacteriology 6. QMC FCI Contract DA11-009-qm-14008, Report no. 21.

Role of pectin in dehydrated foods, by George L. Baker, Donald R. Bradley and Rudolph S. Wilsher. Report no. 13 (Termination report) for period covering 1 July 51 - 30 June 52, under Contract DA11-009-qm-11550. U. S. Quartermaster Food and Container Institute. Jun 1952. 30p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108329

Collaborating institution: University of Delaware. Agricultural Experiment Station. Dept. of Chemistry, Newark, Delaware. Project no. 7-84-06-028. Graphs in illustrations will not reproduce well.
1. Food, Dehydrated - Pectin content 2. Vegetables, Dehydrated - Pectin content 3. Fruit, Dehydrated - Pectin content 4. Pectin - Determination 5. Delaware. Agricultural Experiment Station, Newark, Del. 6. QMC FCI Contract DA11-009-qm-11550, Report no. 13.

FUELS AND LUBRICANTS

Effect of water injection on detonation and preignition, by Alfred Leone. U. S. Naval Air Material Center. Aeronautical Engine Laboratory, Philadelphia, Pa. Jul 1949. 11p fold graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108586

Dates of test: Nov 1947-Dec 1948. Project TED no. NAM-04206.
1. Fuels, Aviation - Preignition - Tests 2. Fuels, Aviation - Injection - Tests 3. Fuels, Aviation - Water content 4. Engines, Aircraft - Detonation 5. Engines, Aircraft - Air-fuel ratio 6. NAV AEL 1087.

Further research on aliphatic esters: Properties and lubricant applications, by G. Cohen, C. M. Murphy, J. G. O'Rear, H. Ravner, and W. A. Zisman. U. S. Naval Research Laboratory. Dec 1952. 34p tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.00. PB 111098

Further research has been made on the properties of a variety of aliphatic esters including mono-, bi-, and tri-basic acid esters, glycol esters, esters of polyhydric alcohols, diester blends, and diester mixtures prepared from a mixture of alcohols. Studies of the relation of ester structure to physical properties confirm and amplify postulates set forth previously concerning the effect of varying the chain length and the location and type of branch chain on viscosity, viscosity temperature coefficient, and pour point. In view of the need for ester lubricants to be stable at elevated temperatures, studies were made also of the relative effectiveness of various antioxidants including phenothiazine-type, amine-type, ether-type, phosphorus-containing, phenol-type, heterocyclic-type, and metal-containing inhibitors. NRL R 4066.

Generalized thermodynamics of high temperature combustion, by C. N. Satterfield, H. C. Hottel, G. C. Williams. Massachusetts Institute of Technology. Division of Industrial Cooperation. May 1947. 58p graphs (part fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 108612

Contract no. Nori-9107, Task C. D.I.C. 6351.
1. Combustion - Gas dynamics 2. Propellants - Thermal properties 3. Gases - Thermodynamic properties 4. Thermodynamics - Tables 5. Thermodynamics - Theory 6. MIT DIC R17.

Present problems and future trends in lubrication, by W. A. Zisman. U. S. Naval Research Laboratory. Nov 1952. 24p photos, graph, table Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.75. PB 111118

This report summarizes the principal problems in the field of lubrication and their relation to recent advances. Wherever possible the probable future trends of research and development are indicated. The lubrication problems discussed include: wear preventive and corrosive properties of oiliness additives, shear strength and durability of extreme pressure agents, internal cohesion and temperature coefficient of viscosity of organic liquids, improvements in the viscosity index scale (V.I.), synthetic oils and their improvement, antioxidants for higher temperatures, the colloidal properties of antirust additives, the relation of oil solubility and shear stability of V. I. improvers to the structure of polymers, the nature of polyvalent soaps and amine-acid complexes and their micelle-forming properties in oils, the rust inhibition and work stability of greases, new gelling agents and their improvement, high temperature greases and bearings, and the approach toward lifetime lubrication in electric motors. NRL R 4080.

Statische tragfähigkeit der schmieröle und eine neue oel-kennzahl (Static bearing strength of lubricating oils and a new characteristic number for oils), by Ubbelohde with experiments by Hans Neumann and Mrs. deJong. Translated and edited by F. A. Raven. Nov 1952. 53p drawings, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 108286

From Kolloid-zeitschrift, vol. 26, no. 2/3 p. 120-140, 1952. Paper presented at convention of the Kolloid Gesellschaft in Cologne 29-30 Sep 1951 and at the

Rheodogy convention in Berlin Oct 1951.
1. Lubricating oils - Effectiveness - Germany
2. Lubricants, Extreme pressure - Germany
3. Bearings, Friction - Lubrication - Germany
4. Lubricating oils - Adsorption - Germany 5. Lubricating oils - Viscosity - Germany 6. STS 160
7. NAVSHIPS T498.

INSTRUMENTS

A-C voltmeter ME-59 (XA-A)/PSM-3, range 750/300/150/75/30/15 volts, frequency range 50 to 1000 cycles per exhibit MCREE 718 dated Dec 27, 1949 and amendment no. 1 dated 13 Dec 1951. Weston Electrical Instrument Corp., Newark, N.J. Interim engineering report, period Nov 23, 1951 to Sep 29, 1952, under Contract no. AF33(038)-13605, by R. W. Davis. Sep 1952. 16p fold drawings, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108220

Weston report WERG-1g-50.
1. Voltmeters, Alternating current - Design 2. ME-59 (XA-A) /PSM-3 (Voltmeter).

Analog computer for correlation functions in communication systems, by R. A. Johnson. Harvard University. Cruft Laboratory. Mar 1952. 53p photos, diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 108536

An analog electronic device capable of measuring correlation functions is described. A variable time delay is achieved by moving a pickup head slowly along a rotating magnetic drum, on which the signal under investigation is recorded. A second channel has a fixed delay, so that zero (or negative) delays can be obtained. Multiplication of the two signals is accomplished by an analog electronic multiplier. The desired correlation function is then plotted by a recording meter which indicates the average value of the multiplier output as the time delay is varied. Sample data from a forthcoming report (No. 145) show typical autocorrelation functions of voltages occurring before and after the second detector of a model communication system. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 144.

Apparatus for the pile irradiation of liquids, an A.E.R.E. report, by B. D. Pate. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Mar 1951. 10p photos, drawings Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 108199

HD 471. S. O. code no. 70-674-0-19.
1. Liquids - Irradiation - Apparatus - Gt. Brit.
2. Sea water - Irradiation - Apparatus - Gt. Brit.
3. Urine - Irradiation - Apparatus - Gt. Brit.
4. Atomic power - Research - Gt. Brit. 5. AERE C/R 643.

Chemical systems sensitive to radiation. Monthly report no. 17, Nov 1-Nov 30, 1952, under Contract no. DA18-108-CML-2562, by Irving A. Berstein, Wolfgang G. Rothschild, Florence F. Spalding, Earle C. Farmer. Tracerlab., Inc., Boston, Mass. Nov 1952. 10p graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108285

Experiments have been carried out to determine the effect on the radiation sensitivity of the anhydrous carbon tetrachloride-benzene-indicator-sensitizer dosimeter of variations in the concentrations of sensitizer and indicator, and to determine the most sensitive composition of the dosimetric solution. Increasing the concentration of imino base of diphenylamine blue indicator to 1.5 times that previously employed (.000016 M/1) led to a more readily visual-radiation-induced change. The response of the dosimeter sensitized by dimethylaniline was virtually independent of the concentration of sensitizer when varied over the range of .00007 M/1 to .07 M/1. Dosimeters using dithiazone or lead dithiazone complex as the indicator were considerably less sensitive to Co-60 gamma radiation than those using the imino-base of diphenylamine blue. Report no. 15 is PB 107894.

Crystal impedance meter TS-330/TSM. U. S. Army. Apr 1951. 74p photos, diagrs (2 fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.50, Photostat $10.00. PB 108609

1. Impedance - Measurements - Equipment
2. Meters, Impedance 3. Crystals, Quartz - Testing equipment 4. TS-330/TSM (Crystal impedance meter) 5. WD TM 11-5051 6. AAF TO 16-35TS-330-5.

Densities and interferometer fringe shifts for Taylor-Maccoll flows, by J. H. Giese. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jan 1952. 29p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108554

1. Mach-Zehnder interferometer 2. Interferometers, Radio 3. Flow, Axial - Theory 4. Taylor-Maccoll conical solution 5. APG BRLR 793.

Digital automatic multiple pressure recorder, by Bert A. Coss, D. R. Daykin, Leonard Jaffe and Elmer M. Sharp. U. S. National Advisory Committee for Aeronautics. Jan 1953. 24p photos, drawings, diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108525

A machine is described which will automatically measure and record 100 pressures in a range from 5 to 65 inches of mercury, in approximately 2-1/2 minutes, to an accuracy of 0.1 inch of mercury. The method used is to compare the unknown pressures with a scanning pressure whose value at any instant

is known in digitalized form. Sensitive diaphragms indicate balance between the unknown and the scanning pressure. All unknown pressures are compared with the scanning pressure simultaneously and the information is stored temporarily within the machine. During read out, the information is properly sequenced, identified, coded, and punched into paper tape, which is the actual permanent record of the output of the machine, although typewritten tabulated data may also be produced. NACA TN 2880.

Digital computer block diagrams, by Robert R. Everett. Massachusetts Institute of Technology. Servomechanisms Laboratory. Apr 1947. 25p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108422

Lecture given at MIT Electrical engineering staff seminar, Apr 9, 1947. Some pages will not reproduce well.
1. Computers, Digital - Operation 2. Computers, Digital - Block diagrams 3. MIT SL M69.

Entwicklung und aufbau eines frequenz-analysators fur den bereich von 30 bis 30,000 Hz. (Development and construction of a frequency analyzer), by A. E. Prokott. May 1950. 19p diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108177

Translation of Physikalisch-Technische Anstalt der Bundesrepublik Deutschland, Braunschweig, May 1950. Sponsored research (Germany) Report no. 2 (series B). P.T.A. Report no. 5.
1. Analyzers, Frequency - Germany 2. Circuits, Amplifier - Germany 3. Germany. Physikalisch-Technische Reicksanstalt 4. DSIR SR 2, series B.

Investigations for design of digital computing machinery. Progress report no. 17 covering period 10 Feb-10 May 1951 under Contract AF33(038)-9461, by Holly Wilkins, Lloyd Call, Robert Burns. Harvard University. Computation Laboratory. May 1951. 164f photos, diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $6.25, Enlargement Print $22.50. PB 108655

For report no. 5 see PB 107827, for no. 10 see PB 108619, for no. 18 see PB 108620.
1. Computers, Digital - Design 2. Computers, Digital - Components 3. Mark IV (Digital computer).

Magnetischer sauerstoffschreiber. Sauerstoffmessung in gasgemischen auf magnetischer grundlage (Magnetic oxygen recorder. Determination of oxygen in gaseous mixtures by a magnetic method), by E. Ebbinghaus. Oct 1942. 22f photos, drawings, graphs, tables (Text in German) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Enlargement Print $5.00. PB 79431s

Listed in BIOS FR 1321 (PB 79431) page 79, exhibit no. 4. Berichte der Betriebskontrolle Oppau no. 446.
1. Oxygen - Determination - Germany 2. Oxygen - Analysis - Apparatus - Germany 3. BIOS FR 1321 LD 4. Micro BIOS/DOCS/2082/798/4 5. Micro BIOS FD 2390/46, Frames 1-22.

Magnetischer sauerstoffschreiber für grossen messbereich mit unterdrücktem nullpunkt (Magnetic oxygen recorder for high measuring range with suppressed zero), by E. Ebbinghaus. Jan 1943. 10f diagrs, graphs, tables (Text in German) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Enlargement Print $2.50. PB 79431s2

Supplement to Berichte der Betriebskontrolle Oppau nr. 446. Listed in BIOS FR 1321 (PB 79431) p. 79, exhibit no. 5.
1. Oxygen - Determination - Germany 2. Oxygen - Analysis - Apparatus - Germany 3. BIOS FR 1321 LD 4. Micro BIOS/DOCS/2082/798/5 5. Micro BIOS FD 2834/46, Frames 1-10.

Sauerstoffmessung in wasser nach Tödt-Freier mit dem "Oxyflux" (Measurement of oxygen in water by the Tödt-Freier method with the use of "Oxyflux). Translated and edited by F. A. Raven. Nov 1952. 4p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108287

Drawings not included.
1. Oxyflux (Trade name) 2. Water - Oxygen content - Measuring equipment - Germany 3. NAVSHIPS T499 4. STS 156.

Theory and design of voltage compensators, vol. 1, by Hans K. Ziegler. U. S. Signal Corps Engineering Laboratories, Ft. Monmouth, N. J. Feb 1952. 296p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.00, Photostat $37.50. PB 108255

The object of this report is to present the theory and the practical method of design of voltage compensators. Volume I is devoted to the treatise of the voltage compensator theory. References to practical design requirements, however, are included in Volume I wherever they appear to further the understanding of the design procedures which are presented in Volume II. The report is drawn up in a textbook manner. In order to make the subject readily understandable, the writer has strived to reduce the problems to their simplest form and to achieve their solutions without resorting to highly advanced analytical methods. Only two components, the direct axis value of armature reaction and the leakage reactance, are considered and all changes in reactances, respectively addition or elimination of reactances for the different steady state and transient load conditions, are accounted for by modification factors. Dept. of the Army project no. 3-18-01-011. Signal Corps project no. 2071-B. SCEL ER 1076.

University of Toronto digital computer. Canada. Defense Research Board. Computation Centre,

University of Toronto, Toronto, Canada. Jan 1951. 8p diagrs (1 fold), table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108636

Report no. DR33. UTECS report 36. DRB grant no. 64.
1. Computers, Digital - Canada 2. Computers, Digital - Design - Canada.

MACHINERY

Design and installation of small compressed air turbines for testing powered dynamic models in the Royal Aircraft Establishment seaplane tank, by D.I.T.P. Llewelyn-Davies, W. D. Tye and D. C. MacPhail. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Apr 1947. 19p photos, drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.25. PB 108300

This report describes the development of small lightweight air turbines for powering dynamic models in the R.A.E. Seaplane Tank. The units have proved to be rugged and reliable and power/weight ratios of 0.4 lb/b.h.p. have been achieved. The installation of the turbines in dynamic models and the provision of their air supply are also discussed. Cover date is 1952. S. O. code no. 23-2620. ARC RM 2620.

Effect of friction on the flow in vaneless diffuser space of centrifugal compressors, an A.E.R.E. report, by J. Woodrow. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jan 1952. 13p diagr Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 108567

Cover date is 1951. HD. 611. Unclassified version of E/R/ 549 of June, 1950. S. O. number is omitted.
1. Fluids, Compressible - Vortex flow - Gt. Brit. 2. Flow, Compressible - Effect of friction - Gt. Brit. 3. Friction - Theory - Gt. Brit. 4. Compressors, Centrifugal - Design - Gt. Brit. 5. Diffusers, Vaneless - Design - Gt. Brit. 6. Vortex motion - Theory - Gt. Brit. 7. Atomic power - Research - Gt. Brit. 8. AERE E/R 817.

Electric furnace for smelting low-grade ores in Japan, by Joseph E. Hersch. Supreme Commander for the Allied Powers. Natural Resources Section. Nov 1949. 41p photos, diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 108682

1. Furnaces, Electric - Design - Japan 2. Smelting - Japan 3. SCAP ERS PS 35.

Experimental investigation of loss in an annular cascade of turbine-nozzle blades of free vortex design, by Hubert W. Allen, Milton G. Kofskey and Richard E. Chamness. U. S. National Advisory Committee for Aeronautics. Jan 1953. 33p photos, diagrs, graphs, table Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108576

1. Cascades (Aerodynamics) 2. Turbines, Axial - Flow 3. Mach number - Effect 4. Boundary layer - Flow 5. Flow - Measurements 6. Probes, Hot wire 7. U. S. Lewis Flight Propulsion Laboratory, Cleveland, Ohio 8. NACA TN 2871.

Handbook, overhaul instructions: Hydraulic motor model MF31-711-30BC-3 (Vickers). U. S. Air Force and U. S. Bureau of Aeronautics. Oct 1949. 19p photos, drawings, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108610

1. Motors, Hydraulic - Maintenance and repair 2. MF31-711-30 BC-3 (Hydraulic motor) 3. ANO3-30CH-35.

Metalworking machine tools. Anglo-American Council on Productivity. Report of a productivity team representing the British machine tool industry which visited the United States of America in 1951. Jan 1953. 104p photos, drawings, map, graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.90. PB 106466

Parts catalog: Hydraulic motor model MF-31-711-30 BC-3 (Vickers). U. S. Air Force and U. S. Bureau of Aeronautics. Oct 1949. 5p drawing Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108611

1. Motors, Hydraulic - Parts 2. MF31-711-30 BC-3 (Hydraulic motor) 3. AN 03-30CH-36.

Pattern dies for investment casting, by S. Lipson and H. Rosenthal. U. S. Frankford Arsenal, Philadelphia, Pa. Pitman-Dunn Laboratory. Nov 1950. 32p photos, diagr, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108112

The fundamental problems encountered in die design for investment castings are discussed. These are the problems of completely filling the die which are related to the effective elimination of the air in the die cavity; stripping the cores without deformation of the pattern; and, finally, removal of the pattern from the die. Die types, such as the fusible alloy die, machined die, sprayed die, and combination die are described and the die making techniques reviewed. The determination of the shrinkage allowance for the master pattern is explained. Project TB4-202. FALR R989.

Primenenie teorii effektivnih nagrooeok k raschetoo podshipnikov porshnevih mashin (Application of

the theory of effective loads to the calculation of dynamically loaded bearings), by A. K. Dyachkof. Translated by Irville C. Lecompte. Edited by F. A. Raven and Margaret W. Raven. Nov 1952. 54p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 108288

From Reports of the Academy of Sciences, U.S.S.R., Dept. of Technical Sciences, no. 11, 1950, p. 1615-1644. Presented by E. A. Chudakof to general meeting of the Section of Technical Sciences, Academy of Sciences, U.S.S.R., 16 May 1950.
1. Bearings, Friction - Load - Russia 2. Bearings, Friction - Lubrication - Russia 3. NAVSHIPS T500 4. STS 148.

Refrigeration, air conditioning, evaporative (desert) cooling and ventilation: Repairs and utilities. U. S. War Dept. Jul 1947. 192p photos, diagrs, drawings, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $7.00, Photostat $25.00. PB 107975

1. Refrigeration - Equipment - Maintenance and repair 2. Air conditioning - Equipment - Maintenance and repair 3. Air cooler, Evaporative - Maintenance and repair 4. Ventilating systems - Maintenance and repair 5. WD TM 5-670.

Search for new nongaseous, nonliquid rectifying system. 15th interim engineering report under Contract AF-33(038)-2460, period May 15-Aug 15, 1952, by T. S. Shilliday, Q. Van Winkle, H. Goering, C. S. Peet and A. E. Middleton. Battelle Memorial Institute, Columbus, Ohio. Aug 1952. 26p drawings, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107918

1. Rectifiers, Titanium oxide 2. Titanium - Purification - Equipment 3. Rectifiers - Filling materials 4. Materials, Heat resistant.

Theoretical studies of the flow through turbomachines (Vortex theory of the flow). Final report, part 1: Infinite number of blades, by Wilhelm Spannhake. Illinois Institute of Technology. Dept. of Mechanical Engineering. n.d. 70p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 108379

The theory of the flow through the guide apparatuses and runners of turbomachines is studied assuming an infinite number of blades, since the results of such an analysis are believed to give a starting point for the theory of a finite number of blades. This theory established about 40 years ago by Von Mises and Bauersfeld is rewritten with a consistent use of the concept of bound vortices, and when it is further developed for compressible flow it is extended to any combination of guide apparatuses and runners. Various examples are discussed, and emphasis is laid on graphical methods, although the analytical way is principally described. The principal usefulness of the theory is also discussed. Project no. 6008. Contract no. Nonr322(00).

Torsion tests of aluminum-alloy stiffened circular cylinders, by J. W. Clark and R. L. Moore. U. S. National Advisory Committee for Aeronautics. Nov 1952. 38p photos, drawings, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107933

1. Cylinders, Circular - Torsion tests 2. Loading stresses 3. Loads, Structural - Calculations 4. Aluminum alloys - Torsion tests 5. Aluminum Company of America, Pittsburgh, Pa. 6. NACA TN 2821.

Zahn-Ravo rapid zerstaubungs-trocken-maschine für flüssige und halb flüssige güter (Zahn-Ravo rapid spray drying machines for liquid and semi-liquid products). Zahn & Co., G.m.b.H., Berlin. 1939-1941. 116f photos, drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.75, Enlargement Print $16.25. PB 105720s

Listed in BIOS FR 1397 (PB 105720). English abstract available as PB 105720s2. 2p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. Also contains drawings of a sodium sulphate plant, plant for the recovery of ferrous sulphate, and a sodium sulphide plant.
1. Evaporators - Design - Germany 2. Sulfates, Ferrous - Recovery - Germany 3. Sodium sulfates - Production - Plants - Germany 4. Sodium sulfite - Production - Plants - Germany 5. BIOS FR 1397 LD 6. Micro BIOS/DOCS/1482/1477 7. Micro BIOS FD 3170/47, Frames 1-41+72.

Zinc and aluminum die casting. Report of a productivity team representing the British zinc and aluminium die casting industry which visited the United States of America in 1951. Anglo-American Council on Productivity. Oct 1952. 121p photos, drawings, diagrs, map, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.00. PB 106462

1. Die casting industry 2. Die casting, Gravity 3. Die casting, Pressure 4. Die casting, Aluminum 5. Die casting, Zinc 6. Aluminum - Castings 7. Aluminum - Uses 8. Zinc - Castings 9. Zinc - Uses.

MEDICAL RESEARCH AND PRACTICE

Aerotitis media, by Reed W. Hyde. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Oct 1952. 26p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108273

The incidence, etiology, and treatment of aerotitis media are discussed, and new data are presented. Emphasis is placed upon the possible predisposing role of upper respiratory infection, nasopharyngeal lymphoid tissue, and allergy. A relation does exist between the incidence of upper respiratory infection and aerotitis, but its importance has been overemphasized. More attention should be paid to the possible role of allergy. Conservative measures, such as vasoconstriction and artificial inflation of the middle ear, are the treatments of choice. AAF SAM Proj Special report.

Antibody response of animals exposed to x-radiation. IV: Levels of x-radiation exposure required to destroy an immunity to Salmonella typhimurium, by John D. Fulton and Roland B. Mitchell. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Dec 1952. 12p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108322

A study was made to determine what level of whole body x-radiation would destroy an immunity to S. typhimurium. To accomplish this study, mice were immunized with heat-killed S. typhimurium antigen and six days after immunization the animals were exposed to various levels of whole body 260 KVP-18 ma. x-radiation. Twenty four hours after exposure to x-radiation the experimental animals were infected with live S. typhimurium organisms. Under the conditions of the experiment it was observed that whole body x-radiation of 200 r or above completely destroyed the animals' resistance to S. typhimurium and in effect converted immune animals into nonimmune animals. The levels of x-radiation required to completely destory the animals' resistance to S. typhimurium is dependent upon the degree of immunity conferred by the immunizing procedure. AAF SAM Proj 21-47-002, Report no. 4.

Auditory efficiency of the hard-of-hearing in noise, by Juergen Tonndorf. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Sep 1952. 20p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108390

Audiometric testing of impaired ears in quiet and at several levels of calibrated white noise revealed that, in noise, the hearing efficiency of these ears does not in all cases follow the pattern established for the normal ear. This fact cannot be predicted from audiometric tests taken in quiet. The maximum articulation score in conjunction with the speech threshold helps to establish the "Social Adequacy Index for Hearing" in quiet, in the customary manner, and also in noise. The change in the index number occurring in noise indicates the relative hearing efficiency for speech in noise. A ratio expressing the relative speech impairment with regard to that for pure tone gives speech a rating as an auditory test for differentiating auditory and extra-auditory causes of speech loss. AAF SAM Proj 21-27-001, Report no. 8.

Biochemistry of tissue trauma. I: Plasma lipoprotein changes induced by acute local cold injury, by Lawrence J. Milch, Robert F. Redmond, and William W. Calhoun, and the Cardiovasular Research Group, Onan W. Bomar, Jr., C. W. Johnson, R. A. Yarnell, J. G. Collins and W. H. Graves, Jr. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Nov 1952. 10p photos, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108279

Plasma lipoprotein levels were determined in rabbits subjected to acute local cold injury. Plasma cholesterol, presumably transported in the blood as a protein conjugate, was increased markedly in the traumatized animals. Highly significant increases were also noted in the plasma concentrations of the S_f 12-20 and 20-100 classes of lipoproteins. That these increases were not the result of a hemoconcentration was established by the fact that little change in either packed cell volume or total protein concentration of the blood plasma could be recorded. The data are discussed with regard to the possible source of increased lipids and, also, with respect to a possible etiologic relationship between traumatic injury and artherosclerosis. AAF SAM Proj 21-1601-0017, Report no. 1.

Biological and medical aspects of ionizing radiation, III: Immediate effect of x-radiation on the isolated striated frog muscle, by Herbert B. Grestner, Charles P. Powell, and Everett O. Richey. U. S. Air Force. School of Aviation Medicine. Randolph Field, Texas. Oct 1952. 11p photo, diagrs, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108391

According to the effect upon the isolated muscle, three dose ranges of x-radiation can be distinguished: (1) a low dose range (0 to 30 kr) in which no significant immediate alteration from normal is found; (2) a medium dose range (30 to 150 kr) in which muscle function is immediately compromised and gross morphological changes in coloration, translucency, and length occur; and (3) a high dose range (above 150 kr) in which an immediate, complete abolishment of muscle function is evidenced and associated with morphological changes similar to, but much more pronounced than, those of the medium dose range. AAF SAM Proj 21-47-005, Report no. 3.

Measurements of the human foot, a literature survey prepared by Florence H. Cozzi. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Laboratories, Technical Library. Jul 1952. 14p Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.50. PB 111097

1. Foot - Measurements - Bibliography 2. QMC TL BS 24.

METALS AND METAL PRODUCTS

Anodic behavior of aluminum and zinc alloys in sea water, by T. P. May, S. Schuldiner, and J. Burbank. U. S. Naval Research Laboratory. Apr 1948. 57p photos, drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 108571

Laboratory studies were made of the current output, anodic corrosion efficiency, polarization characteristics, and film-formation on anodes. This work verified previous investigations that high purity zinc anodes are most effective for the protection of steel in sea water. NRL C 3277.

Development of ferritic weld metal for repair of thick cast armor. Part II: Experimental weld metals for repair of 6 inch armor. Progress report on weldability of commercial armor plate (OD-82), by O. O. Miller, F. C. Kristufek, W. G. Benz and R. H. Aborn. United States Steel Corporation. Research Laboratory, Kearny, N. J. Feb 1946. 26p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108398

In the search for a better ferritic weld metal for repair of thick cast armor, a number of low-alloy compositions were suggested and produced as experimental weld metals. Some contain from 3 to 7% of alloying elements and were suggested on the basis of wide experience with welding electrodes. Others contain as much as 5 to 9% of alloying elements and were suggested on the basis of a consideration of maximum hardenability, maximum secondary harding, ease of solution of alloying elements, minimum retained austenite, minimum possibility of delta ferrite, and minimum temper brittleness. Three additional ones, somewhat lower in alloy content, were suggested primarily for a high M_s temperature (temperature at which austenite starts to transform to martensite on cooling). A procedure has been developed for evaluating the hardenability and toughness of these weld metals in terms of the structure which would be found in repair welds at the center of 6-inch armor after austenitizing and water quenching. NDRC research project NRC-1. Contract OEMsr-552. For Pt. I see PB 15863. OSRD 6584. WMC M-641.

Exploratory investigations of the properties of synthetic rutile single crystals, by S. Zerfoss and R.G. Stokes. U. S. Naval Research Laboratory. Dec 1948. 9p tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.25. PB 111092

Physical and electrical properties of single crystals of titanium dioxide are reported. Dielectric constant and semiconductor properties are discussed as well as variance of color and electrical characteristics with changes in proportion of oxygen to titanium in the lattice. Preliminary indications are that reduced rutile crystals may have application as impedance-matched rectifiers, crystal triodes, or waveguide terminators. NRL P 3398.

Influence of boron and chromium on some properties of experimental steels containing 0.3 per cent carbon and 0.8, 1.25, or 1.6 per cent manganese. U. S. National Bureau of Standards. Progress report, Mar 5, 1943 to Nov 10, 1943, on investigation of boron in armor plate (OD-87), by T. G. Digges and Fred M. Reinhart. Dec 1943. 70p photos, graphs, tables (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 108376

Tests were carried out to determine the influence of boron on the workability, structure, critical points, austenite and McQuaid-Ehn grain sizes, hardenability, notch toughness at room and low temperatures, and tensile properties of experimental steels containing 0.3 percent carbon, 0.25 percent silicon, and varying amounts of manganese and chromium. Heats were prepared with 0, 0.25, 0.50, and 0.75 percent chromium and 0.8, 1.25, and 1.6 percent manganese. Additions with ferroboron were made in the furnace to each heat for an intended boron content of 0, 0.0015, 0.003 and 0.006 percent and in some of the heats additions were made in the ladle with Grainal X-79 for a boron content of 0.0015 and 0.006 percent. The effects of boron, chromium, and manganese on hardenability, notch-toughness and tensile properties of the steels are shown by data assembled in the tables and curves given in the text. NDRC research project NRC-31. Contract symbol no. 1720. WMC M-174. OSRD 3020.

Influence of boron on some properties of experimental steels containing nickel and chromium. U. S. National Bureau of Standards. Progress report, Dec 30, 1943 to May 11, 1944, on investigation of boron in armor plate (OD-87), by T. G. Digges and F. M. Reinhart. Jun 1944. 46p photos, graphs, tables (1 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 108369

Tests were made to determine the effect of boron additions made with ferroboron and Grainal No. 79 on the workability, structure, critical points, austenite and McQuaid-Ehn grain sizes, hardenability notch toughness (Charpy impact) at room and low temperatures, hardness and tensile properties of experimental steels prepared in an induction furnace. Boron additions of 0.0, 0.0007, 0.0010, 0.0015, 0.0030 and 0.0060 percent were made to 6 heats (36 steels) with base compositions consisting of 0.30 percent carbon, 0.8 or 1.6 percent manganese, 0.5 or 1.0 percent nickel and 0.5 percent chromium. Determinations for boron were made by both chemical and spectrographical analyses and nitrogen was determined by a modified Allen method. NDRC research project NRC-31. Contract symbol no. 1720. WMC M-293. OSRD 3769.

Influence of nitrogen on some properties of steels with and without boron and titanium additions. U.S. National Bureau of Standards. Progress report, Jan 22 to May 14, 1943, on investigation of boron in armor plate (OD-87), by T. G. Digges. Jun 1943. 38p photos, graphs, tables (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108405

Tests were carried out to determine the influence of nitrogen on the workability, critical temperature, austenite grain size, McQuaid-Ehn grain size, hardenability, notch toughness at room and low temperatures and the tensile properties of experimental steels containing .3 percent carbon, 1.6 percent manganese without and with .006 percent boron, and with .006 percent boron and .2 percent titanium. The nitrogen content of the different heats ranges from about .003 to .015 percent. NDRC research project NRC-31. Contract symbol no. 1720. WMC M-84. OSRD 1506.

Influence of variations in boron and composition of ferroalloys used for making boron additions on some properties of basic open hearth steels containing 0.4% carbon and 1.6% manganese. U. S. National Bureau of Standards. Progress report on investigation of boron in armor plate (OD-87) by T. G. Digges and F. M. Reinhart. Aug 1944. 90p photos, graphs, tables (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.75, Photostat $11.25. PB 108449

The tests described in this progress report were made to determine the effects of varying amounts of boron with different intensifying agents on the structure, grain size, hardenability, tensile properties and notch toughness (Charpy impact) at room and low temperature of commercial steels. The steels, supplied in the form of 1 1/4 inch rounds as hot-rolled, were from a special basic open hearth heat in which additions were made in the mold with Silcaz No. 3, Silvaz No. 3, Ferroboron, Grainal No. 1, Grainal No. 79, Bortam and Borosil for boron contents ranging from 0.0001 to 0.004 percent. The procedures for preparing and heat-treating the specimens and for carrying out the tests are described in some detail in the text and the test results are presented in tables and summarized in figures. NDRC research project NRC-31. Contract symbol no. 1720. WMC M-336. OSRD 4022.

Influence of variations in boron, carbon and manganese contents on the weldability of steels for armor plate and other military applications. U. S. National Bureau of Standards. Progress report Dec 19, 1942 to Mar 1, 1943, on investigation of boron in armor plate (OD-87), by T. G. Digges. Mar 1943. 19p photos, drawing, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108395

Arc welding tests were carried out on $\frac{1}{2}$ inch thick plates of some experimental steels varying in boron, carbon and manganese contents. The structural features of the welds were similar in all of the steels and no correlation was found between the boron, carbon and manganese contents and the structures of either the heat-effected zone of the plate or weld metal. Maximum increase in plate hardness from welding occurred in the steels with the highest percentage of carbon. In steels with .3 percent carbon variations in boron from 0 to .006 percent and manganese from .8 to 1.6 percent had no significant effect on the tensile strength and ductility of the welds. Apparently .006 percent boron had no deleterious effect on the strength and ductility of the welds made in the .45 percent carbon steels. However, the ductility of the welds in these steels was somewhat inferior to that of the series containing .3 percent carbon. The fracture of all tensile specimens occurred in the weld metal, not in the plate metal. All welds were of good quality and were apparently free from cracks, excessive porosity, voids and slag inclusions. NDRC research project NRC-31. Contract symbol no. 1720. Some pages may not reproduce well. WMC M-57. OSRD 1282.

Influence of variation in boron, composition of ferroalloys used for making boron additions and deoxidation practice on some properties of experimental steels containing 0.3 percent carbon and 1.6 percent manganese (OD-87). U. S. National Bureau of Standards. Progress report from Jan 23-Jun 15, 1943 on investigation of boron in armor plate, by T. G. Digges. Jul 1943. 51p photos, graphs, tables (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 108368

This report covers experiments carried out to determine the effects of variations in composition of ferroalloys used for making boron additions, deoxidation practice, and boron content, on the workability, structure, critical points, austenite and McQuaid-Ehn grain size, hardenability, hardness, notch toughness at room and low temperature, and tensile properties of experimental steels containing 0.3 percent carbon, 1.6 percent manganese, and .25 percent silicon. NDRC research project NRC-31. Contract symbol no. 1720. WMC M-96. OSRD 1617.

Investigation of boron in armor plate (OD-87): Influence of boron on some properties of experimental steels containing 0.3 per cent carbon and varying amounts of manganese, chromium and molybdenum, by T. G. Digges and F. M. Reinhart. U. S. National Bureau of Standards. Sep 1944. 62p photos, graphs, tables (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 108378

The tests described in this final progress report were made primarily to determine the influence of boron additions with Ferroboron and Grainal No. 79 on the structure, grain size, hardenability and notch toughness (Charpy impact) at room and low temperatures of experimental steels containing 0.3 percent carbon, 0.25 percent silicon and varying amounts of manganese, chromium and molybdenum. The testing program was extended, however, to include comparisons of the hardenability and notch toughness of experimental and commercial steels and the recovery

of boron on remelting in an induction furnace. The hardenability effect due to boron varied with the base composition of the steels, the amount of boron retained and the composition of the ferroalloy used for the additions. In general, additions of 0.0007 to 0.001 percent boron were more effective than 0.0015 to 0.006 percent and the additions with Grainal No. 79 were more effective than with Ferroboron. The notch toughness at room and low temperatures of fully hardened and tempered steels was not appreciably affected by relatively small additions of boron, whereas the notch toughness of many of the steels with high boron was inferior to that of the steels without boron. Contract symbol no. 1720. Final report on NDRC research project NRC-31. Also final report under Contract OEMsr-721 with Battelle Memorial Institute dealing with preparation of electric furnace heats of experimental steels. WMC M-361. OSRD 4181.

Investigation of electro deposited alloys and pure metals as substitutes for zinc and cadmium for protective finishes for steel parts of aircraft. Battelle Memorial Institute, Columbus, Ohio. Under Contract no. AF-33(038)-8750.

First progress report, Nov 5 to Dec 23, 1949, by A. B. Tripler, Jr., J. E. Bride, and C. L. Faust. Dec 1949. 26p graph, tables (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108631

Electrodeposited alloys and pure metals are under investigation as substitutes for zinc and cadmium for protective finishes for steel parts of aircraft. Results of continued zinc-silver alloy plating experiments and manganese-tin alloy plating experiments are discussed. Cadmium-silver alloy deposits were exposed in the "wet-dry" cabinet. Weight-loss measurements were made on cast cadmium-silver alloys exposed in the "wet-dry" cabinet. Electrodeposited manganese with tin overlay was also exposed in the "wet-dry" cabinet. Prospects for codeposition of manganese and zinc will be investigated. Pages numbered 1-21. For 2d-5th reports see PB 108632-108635.

Third progress report, Feb 23 to Apr 23, 1950, by A. B. Tripler, Jr. and C. L. Faust. Apr 1950. 25p graph, fold tables Available from Library of Congress, Publication Board Project, Washington 25, D.C. Microfilm $2.00, Photostat $3.75. PB 108633

Progress is reported on an investigation of electrodeposited alloys and pure metals as substitutes for zinc and cadmium for protective finishes for steel parts of aircraft. Methods were developed for preparing zinc-silver (23% Ag) diffusion alloy coatings and Mn-Sn (40% Sn) diffusion alloy coatings. The work on zinc-lead alloy electrodeposition was revived. Zinc-silver, manganese-tin, cadmium-tin, and zinc-nickel diffusion alloy coatings were exposed in the "wet-dry" cabinet. Pages numbered 37-58.

Fourth progress report, Apr 23 to Jun 23, 1950, by A. B. Tripler, Jr. and C. L. Faust. Jun 1950. 28p graphs, tables (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108634

Progress is reported in an investigation of electrodeposited alloys and pure metals as substitutes for zinc and cadmium for protective finishes of aircraft steel parts. The "wet-dry" exposure tests previously started were completed and the results were evaluated. The manganese-tin coatings showed better inherent resistance to corrosion attack than the pure manganese coatings. The pure manganese, however, was superior in providing sacrificial protection for the underlying steel. Cadmium-tin coatings deposited from a fluoborate solution appeared to be slightly more resistant than diffused cadmium-tin coatings, but neither was superior to pure cadmium. No success was achieved in the preparation of zinc-chromium and cadmium-chromium diffusion coatings. X-ray diffraction patterns from the corrosion-resistant, cast, zinc-silver alloys showed pure epsilon phase. Pages numbered 59-81.

Investigation of gases evolved during firing of vitreous coatings on steel, by Dwight G. Moore and Mary A. Mason. U. S. National Advisory Committee for Aeronautics. Jan 1953. 34p photos, diagrs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108575

1. Steel - Coatings, Ceramic - Chemical reactions 2. Steel - Plating - Gas formation 3. Carbon - Oxidation 4. Gases - Analysis 5. U. S. National Bureau of Standards 6. NACA TN 2865.

Investigation of welded H-plates from the 1942-1943 Canadian cold test. United States Steel Corporation. Research Laboratory, Kearny, N. J. Contract OEMsr-552. NDRC research project. NRC-1

Part I: H-plates welded by the unionmelt process. Progress report on weldability of commercial armor plate (OD-82), by R. H. Aborn. Apr 1944. 67p photos (part fold), diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 108396

The primary causes for the high proportion of failures in H-plates welded by the Unionmelt process are believed to be excessive rate of heat input, unfavorable armor compositions, excessive weld reenforcement, and defective welding. The adverse influence of each factor is enhanced when the ballistic shock test is conducted at subzero temperatures. Recommendations are made for the improvement of the ballistic shock quality of Unionmelt-welded armor. Report no. 516. WMC M-265. OSRD 3514.

Part III: H-plates manually welded with austenitic Cr-Ni-Mo-electrodes. Progress report on weldability of commercial armor plate (OD-82) prepared at United States Steel Corporation Research Laboratory on basis of an investigation made by climax molybdenum Research Laboratory, written by O. O. Miller and R. H. Aborn, investigation performed by G. A. Timmons. Sep 1944. 38p photos, fold drawing, tables Available from Library of Congress, Publi-

cation Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108370

Report no. 523.
1. Armor plate - Welding, Electric 2. Armor plate - Ballistic tests 3. Welding - Electrodes - Tests 4. WMC M-869 5. OSRD 4165.

Isothermal and cooling diagrams of NRC-2A weld metal. United States Steel Corporation. Research Laboratory, Kearny, N. J. Progress report on weldability of commercial armor plate (OD-82), by O. O. Miller, F. C. Kristufek and R. H. Aborn. Feb 1946. 24p photos (1 fold) graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108366

The isothermal transformation diagram of NRC-2A weld metal has been determined; from it a cooling transformation diagram has been derived and is compared with cooling curves for weld metal as deposited and also when heat treated in thick plate. Supplementary data, experimental or calculated, include end-quench hardenability, maximum hardness of martensite, Ae_3 temperature, Ae_1 temperature, and M_S temperature of NRC-2A weld metal. Contract OEMsr-552. NDRC research project NRC-1. WMC M-658. OSRD 6586.

Isothermal transformation diagram of NRC-2A weld metal. United States Steel Corporation. Research Laboratory, Kearny, N. J. Progress report on weldability of commercial armor plate (OD-82), by O. O. Miller, F. C. Kristufek, and R. H. Aborn. Dec 1944. 20p fold photos, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108397

A tentative isothermal transformation diagram of NRC-2A metal is presented herein, subject to some revision when work now in progress is completed. Two factors observed in this work are believed to contribute to the very favorable ballistic behavior of NRC-2A weld metal: 1. The ferrite formed at the 100 and 1000°F temperature levels is sharply acicular even when the austenite grain size is small (form other work, acicular structures generally have been found to be associated with superior ballistic properties). 2. The rapid formation of ferrite in the neighborhood of 1000°F so enriches the austenitic pools with carbon (which greatly retards the transformation rate) that, under conditions of weld cooling, these austenitic pools transform to martensite instead of to a higher-temperature ferrite-carbide aggregate which is less resistant to shock. Memorandum no. 603. NDRC research project NRC-1. Contract OEMsr-552. WMC M-435. OSRC 4478.

Lattice dynamics of body-centered and face-centered cubic metallic elements, by Jules de Launay. U. S. Naval Research Laboratory. Jan 1943. 32p diagrs Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.00. PB 111107

The Born-von Kármán lattice dynamics for the body-centered and face-centered cubic monatomic metals are reviewed giving particular attention to the role which the conduction electrons play in thermal vibrations and in velocity of sound measurements. The connection between the dynamic parameters of the lattice theory and the results of velocity of sound measurements is explicity shown. NRL R 4083.

Manufacturing and welding of homogeneous armor plate from boron treated plain carbon and low alloy steel (OD-74). Final report. General Motors Corp. Buick Metallurgical Laboratory. NDRC research project NRC-29, OEMsr-975.

Part I: Results of experimental work on prime homogeneous armor from Sep 1, 1942 to Mar 31, 1944, by V. E. Hense, D. P. Buswell, C. E. Fisher, and R.B. Schenk. Dec 1944. 116p photos, diagrs, tables (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.75, Photostat $15.00. PB 108450

This report deals with the manufacture of machinable and high hardness homogeneous armor plate from boron treated plain carbon and low alloy steels. Machinable homogeneous armor was processed in the light gauges, namely, 1/4, 3/8, 1/2, 3/4, and 1-inch. Initial work consisted of varying the heat treating cycles on the plain carbon boron t reated steels tested. Various carbon and manganese contents were investigated. WMC M-431. OSRD 4482.

Part II: Results of experimental work on welded homogeneous armor from Sep 1, 1942 to Mar 31, 1944, by V. E. Hense, S. M. Spice, F. F. Roberts, and R. B. Schenck. May 1945. 151p photos, diagrs, graphs, fold, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $6.00, Photostat $20.00. PB 108452

This report deals with the welding of machinable and high hardness homogeneous armor processed from plain carbon and low alloy boron treated steels. The initial work consisted of tests to determine the usability of various types of ferritic and austenitic electrodes in various sequences by means of a torture test with and without chill bars. Specially designed water cooled copper chill bars were successfully used to control the weld heat affected zone in order to maintain a high ballistic penetration limit. WMC M-519. OSRD 5142.

Post-ballistic comparison of manganese-molybdenum ferritic electrodes within and without the NRC-2A specification. United States Steel Corporation. Research Laboratory, Kearny, N. J. Progress report on weldability of commercial armor plate (OD-87), by W. G. Benz, R. F. Campbell, F. C. Kristufek and R. H. Aborn. Feb 1946. 28p photos, drawings, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108367

This report presents the results of a comparison, by several methods, of a ballistically superior and an in-

ferior ferritic welded H-plate employed to evaluate the ballistic shock resistance of welded armor. The weld metals of both plates contain almost identical percentages of carbon, manganese, silicon, and molybdenum, within the range specified for this type of weld metal. Notched-bar impact tests at several temperatures from -94 to +80F confirm the difference in toughness observed in the shock test. From a comparison of single and triple width specimens tested at -40 and +80F the notch sensitivity of the ballistically poor weld metal is clearly greater than that of the ballistically superior weld metal. Hardness measurements indicate that the poor weld metal is harder at the faces of the joint and softer in its inner portions than the superior weld metal at comparable positions in the joint. Report no. 561. Contract OEMsr-552. NDRC research project NRC-1. WMC M-640. OSRD 6585.

Preliminary investigation of residual stress in a welded H-plate. United States Steel Corporation. Research Laboratory, Kearny, N. J. Progress report on weldability of commercial armor plate (OD-82), by R.H.H. Pierce, Jr., W. G. Benz, and R. H. Aborn. Mar 1944. 48p diagrs (part fold), graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 108448

Preliminary measurements on a welded H-plate indicate the presence of very considerable residual stresses in and near the welds. Report no. 511. NDRC research project NRC-1. Contract OEMsr-552. WMC M-232. OSRD 3348.

Radio-isotopes of iron. Preparation of solutions of high specific activity, an A.E.R.E. memorandum, by F. Hudswell and K. J. Taylor. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1952. 4p table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30. PB 108334

The present methods of preparation of potassium ferrocyanide from the separated isotopes ^{54}Fe and ^{58}Fe are described. A very simple method is used for the separation of ^{55}Fe, ^{59}Fe or a mixture of the two from the pile irradiated ferrocyanide, and the yield is good. Recovery of the ferrocyanide for re-irradiation is very important in the case of the separated isotopes, and details of the procedure are given. S. O. code no. 70-674-0-99. AERE I/M 18.

Sources of iron ore in Asia, by Joseph F. Harrington and Benjamin M. Page. Supreme Commander for the Allied Powers. Natural Resources Section. Mar 1952. 178p drawings, maps, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $6.50, Photostat $22.50. PB 108683

1. Iron ores - Asia 2. SCAP NRS 154.

Stress analysis of welded sections. National Research Council. War Metallurgy Committee. Advisory report, by E. S. Jenkins. Feb 1946. 18p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108372

Report presents the results of a survey and an analysis of the probable causes of brittle failures in welded ship steel, and proposes a method of studying such failures. Contract OEMsr-307. NDRC survey project SP-25. WMC M-629. OSRD 6591.

Symposia on materials and design for lightweight construction: Titanium seminar. U. S. Army. Corps of Engineers. Engineer Research Development Laboratories, Fort Belvoir, Va. Aug 1952. 95p photos, graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $2.50. PB 111083

Contents: History of titanium, by O. C. Ralston. - Present production status of titanium, by R. S. Radcliffe. - Production properties and uses of high purity titanium, by E. A. Anderson. - Physical and mechanical properties of commercial titanium and its alloys, by W. L. Finlay. - Corrosion resistance of titanium and its alloys, by F. L. LaQue. - Shop characteristics of commercial titanium and its alloys, by T. W. Lippert. - Casting and forging of titanium and its alloys, by F. H. Vandenburgh. - Applications and potential uses for titanium and its alloys, by N. E. Promisel.

Titanium alloy phase diagrams for the systems titanium-manganese, titanium-tantalum and titanium-tungsten. Battelle Memorial Institute, Columbus, Ohio. Under Contract no. AF33(038)-8544.

Progress report for the period Dec 12, 1950 to Feb 12, 1951, by D. J. Maykuth, R. M. Goldhoff, H. R. Ogden and R. I. Jaffee (Iodide titanium metal base), J. W. Holliday, J. G. Kura and L. W. Eastwood (Process A titanium metal base). Feb 1951. 33p photos, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108614

Progress is reported on the titanium-alloy diagrams for the titanium-manganese, titanium-tantalum, and titanium-tungsten systems. Satisfactory melting of the refractory high-tungsten and high-tantalum alloys has been achieved by the method of arc-melting sintered powder compacts of the desired composition. An upset forging operation has been incorporated in the alloy fabrication schedule as a means of improving the uniformity of structure in the strip produced. Sufficient data are now available for a correlation between process A titanium-metal base and iodide titanium-metal bases. In general, the beta transus of each system prepared with process A titanium is higher and the alpha transus is lower than those in the iodide titanium-base systems. The beta-I (Ti-Mn) two phase field, up to 25% manganese, appears tentatively to extend to higher temperatures with process A alloys than with iodide alloys. Figures 7-8 omitted.

Progress report for the period Jun 12-Aug 12, 1950, by D. J. Maykuth, R. M. Goldhoff, R. I. Jaffee, and B. W. Gonser. Aug 1950. 30p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108427

A description is given of the work done in the investigation of the titanium-alloy phase diagrams for the systems titanium-manganese, titanium-tantalum, and titanium-tungsten. All the results given came from experimental work with an iodide titanium base. Hardness data on unalloyed iodide titanium show that the processing techniques can be conducted under essentially contamination-free conditions. Melting was completed on the initial series of 33 alloys of titanium with manganese, tungsten, and tantalum. Ingots containing 30% manganese, 30% tungsten, and 40% tantalum were fabricated to 0.06-in. strip by hot rolling in air at temperatures up through 1562°F. Metallographic studies on quenched titanium-rich alloys indicate that both manganese and tungsten stabilize the beta modification of titanium.

Progress report for the period Aug 12-Oct 12, 1950, by D. J. Maykuth, R. M. Goldhoff, H. R. Ogden, R. I. Jaffee, J. W. Halladay, J. G. Kura, and L. W. Eastwood. Nov 1950. 40p graphs, tables (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108428

Process A metal base and Iodide titanium metal base were the subjects of investigation to determine various properties such as transformation temperature, melting point, X-ray diffraction, alloy preparation, and melting range. Chemical analyses were conducted on the initial series of thirteen Ti-Mn alloys, and results are tabulated. Thirty new Ti-Mn alloys which were prepared principally for melting point determination are listed. After unsuccessful attempts to prepare new Ti W alloys by arc-melting, it was concluded that the preparation of high-tungsten alloys by direct arc-melting is a tedious and doubtful process.

Progress report for the period Oct 12-Dec 12, 1950, by D. J. Maykuth, R. M. Goldhoff, H. R. Ogden and R. I. Jaffee. Dec 1950. 31p photos, diagr, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108429

Progress is reported in using the iodide titanium metal base. Apparatus has been set up for measuring change in electrical resistance of small strip specimens with temperature. Curves have been obtained for unalloyed iodide titanium and a 3.66% manganese alloy. Further modifications have been made in the heater assembly used in measuring melting-range temperatures. Forty grams of powder have been prepared from iodide titanium by hydrogen treating and crushing iodide titanium as-deposited rod. Hardness of control ingot prepared from this powder by vacuum sintering and arc melting showed some contamination has occurred. This powder is being used for further experiments in preparing the refractory high-tungsten and high-tantalum alloys. Workable range of Ti-Mn alloys has been placed at slightly more than 20% manganese. Date are supplied on transformation in titanium-rich alloys of manganese, tungsten, tantalum.

Weldability of commercial armor plate: Influence of thermal stress relief on the hardness of five types of 1-1/2 inch rolled armor (OD-82), by R. H. Aborn and R. E. Brien. United States Steel Corp. Research Laboratory, Kearny, N. J. May 1943. 12p graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108359

The object of this investigation was to determine the effect of thermal stress-relief treatments at 1000, 1100, 1200, 1300°F upon the hardness of five types of current, commercial 1-1/2" rolled armor plate. Treatment at 1100°F or below produced no substantial loss in hardness; treatment above 1100°F caused a marked decrease in hardness in all five types. Progress report under Contract OEMsr-552. Project NRC-1. WMC M-73. OSRD 1468.

METEOROLOGY AND CLIMATOLOGY

Absorption of atmospheric water-vapor in the K-band region, by R. H. Dicke, R. L. Kyhl, A. B. Vane, E. R. Beringer. Massachusetts Institute of Technology. Radiation Laboratory. Jan 1946. 40p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108357

The absorption of microwave radiation in traversing the atmosphere has been measured at three frequencies in the K-band region using Dicke's Microwave Radiometer. This apparatus is described in detail, together with details of the experimental method. These results, together with measurements of the atmospheric water-vapor content, and the theory of VanVleck, are used to calculate the absorption coefficient for moist air at sea-level (1015 millibar, 293°K). The absorption coefficients are .020, .047, and .025 db/naut. mile/gmH_2O/meter^3 at the wavelenghts 1.00 cm, 1.25 cm, and 1.50 cm respectively. These values are in poor agreement with those theoretically predicted. Measurements of the radiation from the sun, terrestrial objects, and clouds, are also presented. Contract OEMsr-262. NDRC Div 14. MIT Rad Lab 1002.

Approximate computation of atmospheric oscillations. I: Zonally symmetrical oscillations, by B. Haurwitz and R. Sawada. New York University. College of Engineering. Dept. of Meteorology and Oceanography. Research Division. Sep 1952. 18p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108099

A method is given for the rapid computation of the free periods of the zonal oscillations of a rotating fluid shell if the oscillation and its period are known for a given value of the physical parameter and are

to be found for slightly different values of this parameter. The method can be extended to take into account the effect of latitudinal temperature gradients. Contract no. AF19(122)-49. Scientific report no. 2.

Forecasting the mountain wave, by C. F. Jenkins. U. S. Air Force. Cambridge Research Center. Geophysics Research Directorate, Cambridge, Mass. Sep 1952. 29p photos, maps, diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108595

1. Atmosphere - Turbulence - Meteorological aspects 2. Currents, Air 3. Meteorology, Aeronautical 4. Weather forecasting 5. AAF GRD SG 15.

NRL fog cabinet and the Army and Navy aeronautical specification humidity cabinet, by H. R. Baker and D. T. Jones. U. S. Naval Research Laboratory. July 1947. 19p photos, drawings, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.50. PB 111044

The consistency of results on panels in all positions of both cabinets was studied using both uncoated cold rolled steel specimens and panels coated with various rust-inhibiting lubricants and preservative compounds. The advantages and disadvantages of each cabinet are discussed. NRL C-3100.

On the propagation and growth of jet stream waves, by Sverre Petterssen. U. S. Air Force. Air Weather Services, Andrews Air Force Base, Washington, D. C. Nov 1951. 45p diagrs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 108083

1. Atmosphere - Circulation 2. Atmosphere, Upper - Research 3. Radio waves - Propagation - Tropospheric 4. Jets, Air - Supersonic - Flow 5. Troposphere - Research 6. AAF AWS TR 105-80.

MINERALS AND MINERAL PRODUCTS

Absolute neutron density determinations using cobalt, by an A.E.R.E. report, by D. J. Littler and R. H. Thomas. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Sep 1952. 9p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.45. PB 108338

This report describes how cobalt wire may be used for the absolute integration of thermal neutron density over any period of time up to several years. Thermal neutron densities in B.E.P.O. have been measured by irradiating together cobalt wires and sodium carbonate. The absolute values of the thermal neutron densities as determined by the cobalt wires and the sodium carbonate agree to $\pm 4\%$. HD. 762. AERE R/R 1019.

Development of thin sheet titanium base ceramic condensers for high temperature operation. Gulton Mfg. Corp., Metuchen, N. J. Final report under Contract no. W36-039-sc-32095, period 22 Apr 1946 to 21 Nov 1948. Apr 1949. 100p photos, drawing, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.25, Photostat $12.50. PB 108078

1. Capacitors, Ceramic dielectric 2. Ceramics, Barium titanate 3. Ceramics - Dielectric properties 4. Ceramics - Fabrication 5. Ceramics, Heat resisting 6. Dr. Blade machine 7. Ceramics, Thin sheet - Production 8. Mica - Substitutes.

Progress report no. XII on Projects N5ori-07801 and N5ori-07858. Massachusetts Institute of Technology. Nov 1952. 50p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 108282

1. Spectroscopy, Dielectric 2. Spectroscopy, Optical 3. Crystallography, X-ray 4. Conductors, Semi - Ferromagnetic 5. Magnetite - Properties 6. Crystals - Growth.

Quantitative study of uranium-graphite lattices, an A.E.R.E. report, by E. A. Guggenheim and M. H. L. Pryce. Edited for the purpose of declassification, by C. A. Rennie. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Aug 1945. 41p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.40. PB 108336

1. Graphite, Irradiated - Uranium lattices - Gt. Brit. 2. Uranium - Crystal structure - Graphite content - Gt. Brit. 3. Atomic power - Research - Gt. Brit. 4. AERE R/R 922.
Revised edition June 1952. S. O. code no. 70-674-0-98.

Quartz growth and hydrothermal studies. Antioch College, Yellow Springs, Ohio. Final report, quartz research project, under Contract no. DA36-039-sc-52, Mar 15, 1950-Mar 14, 1952, by G. E. Owen, J. F. Corwin, A. C. Swinnerton, R. G. Yalman, and R. M. Garrels. Mar 1952. 35p drawing, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108082

Dept. of the Army project: 3-99-11-022. Signal Corps project: 37-142B.
1. Crystals, Quartz - Research 2. Ions - Diffusion 3. Diffusion, Hydrothermal - Measuring equipment.

Research on point-contact, field-controlled semiconductor devices. Battelle Memorial Institute, Columbus, Ohio. Fifth interim engineering report, period June 11, 1952 to Sep 11, 1952, under Contract no. AF 33(038)-23704, by W. E. Bulman, C. S. Peet, O. J. Mengali, and A. E. Middleton. Oct 1952. 38p photo, drawing, graphs, tables Available from Library of Congress, Publication Board Project,

Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108312

For 3d report see PB 107416.
1. Conductors, Semi - Materials 2. Fieldistors 3. Germanium - Preparation.

ORDNANCE AND ACCESSORIES

Characteristic roots of certain matrices, by B. Dimsdale and I. R. Hershner. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Dec 1951. 60p diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 108265

A general theory is developed for a certain class of matrices, of which one case has important statistical application. This theory leads to a practicable and efficient algorithm for computing the roots on automatic computing machines, and a tabulation is given for an important case. Project no. TB3-0007 of the Research and Development Division, Ordnance Corps. APG BRL R 814.

Development of preservative coatings for M50-type magnesium bomb bodies, by Milton A. Raun. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Aug 1952. 58p photos, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 108446

CRLR 32. Project 4-91-01-001.
1. Bombs - Cases - Tests 2. Bombs, Magnesium - Bodies - Protective coatings 3. Coatings, Protective - Materials 4. Bodies, Magnesium bomb - Preservative coatings 5. M50 (Magnesium bomb bodies) 6. CC CRL R 32.

Matrix inversion by partitioning, by Mark Lotkin and Russell Remage. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jul 1952. 49p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 108266

The inversion of matrices may be accomplished by a variety of methods. The purpose of this report is the examination of one of these methods with regard to inherent accuracy and suitability for high speed computing machinery. After giving brief outlines of the partitioning method and a feasible iteration procedure the scaling and digitalizing problems, necessary steps in the translation from mathematical theory to computational practice, are carefully described and analyzed. It is found that the proposed method will yield sufficiently accurate inverses in most cases of practical interest. Project no. TB3-0007K of the Research and Development Division, Ordnance Corps. APG BRL R 823.

Measurements of seeing, by Herbert P. Eckstein. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Dec 1951. 33p photo, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108552

Project no. TB3-0838 of the Research and Development Division, Ordnance Corps.
1. Missiles, High altitude - Optical measurements 2. Atmosphere - Light transmission - Measurements 3. Atmosphere - Turbulence - Effect on visibility 4. Atmosphere - Visibility 5. Schlieren method 6. Telescopes, Azimuth 7. Photography, Aerial 8. Shock waves - Photography 9. APG BRLR 776.

PHOTOGRAPHIC AND OPTICAL GOODS

Effects on learning of the prominence of organizational outlines in instructional films, by Dean S. Northrop. Pennsylvania State College, State College, Pa. Oct 1952. 26p tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.50. PB 111115

Contract N6 onr-269.
1. Motion pictures, Educational 2. Motion pictures, Educational - Captions 3. SDC TR 269-7-33.

Evaluation of a procedure for using daylight projection of film loops in teaching skills, by S. F. Harby. Pennsylvania State College, State College, Pa. May 1952. 13p photos, graph, table Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.50. PB 111093

Contract N6 onr-269, T. O. VII.
1. Motion pictures, Educational 2. Psychology, Applied 3. SDC 269-7-25.

Relative effectiveness of color and black and white in instructional films, by A. W. Vander Meer. Pennsylvania State College, State College, Pa. Jun 1952. 24p tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.50. PB 111095

Contract N6onr-269.
1. Motion pictures, Educational 2. Motion pictures, Colored 3. SDC 269-7-28.

PHYSICS

General

Alternative method of solving Hallen's integral equation and its application to antennas near resonance, by Ronold King. Harvard University. Cruft Laboratory. Jul 1952. 27p graphs, table Available

from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108546

Hallen's complex integral equation for the current in a cylindrical antenna is separated into two real integral equations for the components of current in phase and in phase-quadrature with the driving voltage. Each of these equations is solved by iteration using zeroth-order currents and vector-potential differences to define expansion parameters. It is shown that for electrical half-lengths near odd multiples of a quarter-wavelength at least a third-order solution is required in order to determine accurately the component of current in phase with the driving voltage and the conductance. Conductances for a range of radii are evaluated by the new third-order formula and compared with the King-Middleton second-order values and with the experimental data of Hartig. The new formula agrees excellently with experimental results of $h = \lambda_0/4$ whereas the earlier second-order formula has by far its greatest per cent error -- near 8 to 10 per cent -- in a small range near resonance, just as for very short and very long antennas, adequate account must be taken in the iteration of both components of current. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 154.

Auroral research. Saskatchewan. University. Physics Dept. Progress report no. 6 for the period May 31, 1951 to Aug 31, 1951 under Contract no. AF19 (122)-152, by B. W. Currie and W. Petrie. Sep 1951. 5p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108343

1. Aurora borealis 2. Spectrographs 3. Spectrography.

Dynamics of ionized media, preliminary report, by P. L. Bhatnagar, Max Krook, and Donald H. Menzel. Harvard University. Harvard College Observatory. Solar Dept. Jul 1952. 60p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 108122

Scientific report no. 3. Contract AF19(604)-146. 1. Gases, Ionized - Dynamics 2. Plasma, Electron - Oscillations 3. Magnetohydrodynamics 4. Equations of motion 5. HU HCO SR3.

Intensity measurements of molecular spectra. I: Spectroscopic intensities and photographic blackening, by R. W. Nicholls. University of Western Ontario. Dept. of Physics. Oct 1952. 18p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108119

Scientific report no. 1 under Contract no. AF19(122)470. 1. Molecules - Spectroanalysis 2. Spectra - Intensity - Measurement 3. Spectroscopy, Nuclear.

Inversion of a class of operators of physical interest, by Julian Keilson. Harvard University. Cruft Laboratory. Jan 1951. 21p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108510

Many operators of physical interest have their simplest representation in Fourier transform space, in which they are at least formally invertible. The explicit invertibility in coordinate space of a one-dimensional physical operator, or an isotropic three-dimensional operator, will be assured by the Laurent expansibility of the operator's transform and of its reciprocal about infinity. Operators invertible in this sense form a commuting group with an additive property. The important sub-group of operators associated with real, rational, even transforms are discussed. The basic physical operators ∇^2, ∇^2+a^2, do not belong to this group and have, correspondingly, associated pathological properties. They must be treated in transform space as limiting forms of our invertible operators. Different limiting procedures may be chosen to correspond to different boundary conditions needed at infinity. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 120.

Nature of the Monte Carlo method, by Julian Keilson. Harvard University. Cruft Laboratory. Nov 1951. 17p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108530

A survey is given of ideas underlying the various numerical approaches to the solution of differential and integral equations based on probability ideas and known as Monte Carlo methods. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 137.

Nomograms for the computation of tropospheric refractive index, its gradients and discontinuities, by Donald M. Swingle. Harvard University. Cruft Laboratory. Feb 1950. 27p diagrs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108494

Three sets of nomograms permitting calculation of tropospheric refractive index, refractive index discontinuity, and refractive index gradient are presented. So far as is known, no similar charts have been made for discontinuity and gradient calculations All three have been designed about the standard radiosonde transmission, which gives temperature, dew-point temperature, and pressure at points where discontinuities occur in the vertical gradients of temperature or dew-point temperature. These nomograms are valid for all wavelengths greater than 1.5 cm. Contract N5ori-76, Task order no. 28, NR-078-011. HU CL TR 102.

On Brownian motion, Boltzmann's equation, and the Fokker-Planck equation, by Julian Keilson and James E. Storer. Harvard University. Cruft Laboratory. Jul 1951. 22p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108521

In order to describe Brownian motion rigorously, Boltzmann's integral equation must be used. The Fokker-Planck type of equation is only an approximation to the Boltzmann equation and its domain of validity is worth examining. A treatment of the Brownian motion in velocity space of a particle with known initial velocity based on Boltzmann's integral equation is given. The integral equation, which employs a suitable scattering kernel, is solved and its solution compared with that of the corresponding Fokker-Planck equation. It is seen that when M/m, the mass ratio of the particles involved, is sufficiently high and the dispersion of the velocity distribution sufficiently great, the Fokker-Planck equation is an excellent description. Even when the dispersion is small, the first and second moments of the Fokker-Planck solution are reliable. The higher moments, however, are then in considerable error--an error which becomes negligible as the dispersion increases. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 133.

Propagation of structure-borne sound, by Lothar Cremer. n.d. 234p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $8.25, Photostat $30.00. PB 108561

Work carried out at the Physikalisches Institut der Universität Göttingen.
1. Sound - Propagation - Theory - Germany
2. Göttingen. Universität. Physikalisches Institut
3. DSIR SR 1 (Series B).

Rigorous solution of a many-body problem, by Karl Wildermuth. New York University. Washington Square College of Arts and Sciences. Mathematics Research Group. Aug 1952. 19p Available from Mr. S. Freedman, CRMPC, Air Force Cambridge Research Center, 230 Albany St., Cambridge, 39, Mass. PB 108228

The scattering cross-section is calculated for the problem of a particle incident on another bound to the origin. The scattered particle interacts both with the fixed potential at the origin and the bound particle. Two solutions are obtained: one for the case where the two particles are similar and one for the case where they are dissimilar. The motion of each particle is one-dimensional, and the interactions are artifically chosen so that the Schrödinger equation is integrable. Thus, although the model chosen here has no physical reality, it is expected that the results will be useful in evaluating approximation techniques for physical particle scattering problems. Research report no. CX-3. Contract no. AF-19(122)-463.

Sound absorption measurements in pure water and aquesous solutions of salts in the frequency range of 50 to 500 kc/s, by Konrad Tamm. Aug 1950. 41p photo, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 108178

Translation of III Physikalisches Institut der Universität Göttingen, August, 1950. No German title given. Sponsored research (Germany) Report no. 3 (Series B).
1. Water - Acoustic properties - Germany 2. Water - Sound absorption - Measurements - Germany 3. Salt solutions - Sound absorption - Measurements - Germany 4. Sound - Absorption - Germany 5. Göttingen. Universität. Physikalisches Institut 6. DSIR SR 3, series B.

Statistical nature of inverse Brownian motion in velocity space, by Julian Keilson. Harvard University. Cruft Laboratory. May 1951. 14p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108517

The stochastic nature of the velocity fluctuations of a particle moving in a gas is examined. It is shown that Smoluchowski's equation governing the motion is equivalent to Boltzmann's equation which must be regarded as basic to the description of all such stochastic processes. Ordinary Brownian motion is examined from this point of view and with the help of a number of simple assumptions on the scattering process a characteristic Fokker-Planck equation is obtained. Finally, inverse Brownian motion, that of a light particle in a heavy gas is considered. Contract N5-ori-76, Task order no. 1, NR-078-011. HU CL TR 127

Study of pressure effects on vaporization rate of drops in gas streams, by Robert D. Ingebo. U. S. National Advisory Committee for Aeronautics. Jan 1953. 36p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108480

1. Heat - Transference 2. Liquids - Evaporation 3. Atmosphere - Pressure - Effect on evaporation rates 4. U. S. Lewis Flight Propulsion Laboratory, Cleveland, Ohio 5. NACA TN 2850.

Tables of modified cosine-integral. Stanford Research Institute. Aircraft Radiation Systems Laboratory, Stanford, Calif. Jan 1951. 65p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 108247

Introduction signed by C. T. Tai. Work done by Telecomputing Corporation, Burbank, Calif. Contract no. AF 19 (122)78. Technical report no. 15, SRI project no. 188.
1. Tables, Mathematical 2. Integrals - Tables
3. Telecomputing Corporation, Burbank, Calif. 4. SRI Proj 188, Technical report no. 15.

Tabulation of selected confluent hyper geometric functions, by David Middleton and Virginia Johnson. Harvard University. Cruft Laboratory. Jan 1952. 65p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 108532

Contract N5ori-76, Task order no. 1, NR-078-011.
1. Tables, Mathematical 2. Hypergeometric functions
3. HU CL TR 140.

Tentative model of the sun, by R. H. Woodward. Harvard University. Cruft Laboratory. Jun 1949. 18p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108466

Owing to the nonuniform rotation of the photosphere in the solar magnetic field, a high potential difference is established on the surface of the sun between the poles and the equator. Since at high altitudes electrons are free to travel between the polar and equatorial regions without cutting lines of magnetic force, a large vertical potential gradient is developed at low and intermediate latitudes. The intense heat and visible and ultraviolet light of the chromosphere are considered to result from the outward flow of electrons through the severing layer and chromosphere where excitation and ionization by bombardment take place. The ratio of flow, and therefore the intensity of ultraviolet light, which controls the ion-density of the ionosphere, depends on sunspot activity. The occasional electrical breakdowns of the solar atmosphere are thought to cause streams of electrons and negative ions to be ejected from the photosphere; these are observed as prominences. Positively charged gaseous material is drawn along the electron streams from coronal space to the centers of attraction in the photosphere. The cooling and magnetism of sunspots and the associated radiation of radio-frequency energy are considered to arise from the sustained outward flow of electrons from the photosphere. Contract N5ori-76, Task order no. 1, NR-071-011. HU CL TR 82.

Theory of measurements on random time functions, by R. A. Johnson and D. Middleton. Harvard University. Cruft Laboratory. May 1951. 42p diagrs, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 108515

The statistical errors in measurements requiring the time average of various properties of (stationary) random time functions are analyzed for their dependance on the averaging interval, the method of averaging, and the statistics of the particular time function under observation. A short discussion of the relative merits of correlators and spectrum analyzers is included, together with a brief treatment of the distribution functions of filtered waves. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 125.

Transition probabilities of molecular band systems, I: Transition probabilities and intensities of molecular spectra, by R. W. Nicholls. University of Western Ontario. Dept. of Physics. Nov 1952. 29p diagr, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108581

Contract no. AF19(122)-470. Scientific report no. 3. 1. Molecules - Spectroanalysis - Canada 2. Spectroscopy, Molecular - Mathematical analysis - Canada 3. Molecular theory - Canada 4. Probability - Canada.

Transmission through a rectangular aperture in an infinite screen, by Winston S. Lucke. Stanford Research Institute. Aircraft Radiation Systems Laboratory, Stanford, Calif. Sep 1951. 27p diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108253

This report is concerned with the analysis of the transmission of an electromagnetic wave through a rectangular aperture in an infinite, perfectly conducting screen. The wave is assumed to be perpendicularly incident upon the screen with the electric field parallel to the narrow dimension of the aperture. The problem is analyzed by means of the appropriate integral equation which is solved by the Schwinger Variational Method. Particular attention is given to calculation for apertures which have length-to-width ratios between 2.0 and 100. Contract no. AF19(122)78. Technical report no. 25, SRI project no. 188.

Two new non-linearized conical flows, by J. H. Giese and H. Cohn. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jun 1952. 16p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108557

Project no. TB3-0108H of the Research and Development Division, Ordnance Corps.
1. Taylor-Maccoll conical solution 2. Prandtl-Mayer theory (Aerodynamics) 3. Equations, Nonlinear 4. Flow, Axial - Theory 5. Busemann second-order-approximation theory 6. APG BRLR 819.

Nuclear

Ionization by electron impact of excited hydrogen atoms, an A.E.R.E. report, by F. Mandl. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Aug 1952. 14p diagr, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 108340

The cross-section for the ionization of atomic hydrogen in 2s and 2p-states, by electron impact, is calculated. For the $(2p,m = \pm 1)$ excited states the numerical computation has been carried out and a cross-section v. energy curve has been obtained. The calculation employs first order perturbation theory, the ejected atomic electron being described by a Coulomb wave-function, the bombarding electron, before and after collision, by plane waves. Hence one expects this calculation only to be valid for large energies. This is also required in order to justify the fact that we neglect the interaction of the two electrons, apart from it causing a first order transition, and that we neglect the possibility of electron exchange. On account of these approximations one cannot place much confidence in the energy v. cross-section curve at moderate energies. Comparison with the cross-section for the ground state and the classical formula of J. J. Thomson however suggests that the cross-section is appreciably larger (by about a factor 10) for the $(2p,m=\pm 1)$-states than for the ground state. HD. 758. S.O. code no. 70-674-1-02. AERE T/R 1006.

Lecture notes on pile theory, an A.E.R.E, lecture, by C. A. Rennie. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1952. 34p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.25. PB 108335

These lecture notes deal with the basic nuclear design features of natural uranium graphite moderated thermal reactors. Where possible references are given to published papers which contain a fuller treatment of the points under discussion. HD. 745. S. O. code no. 70-674-0-97. AERE R/L 5.

Measurement of an absolute thermal neutron density in G.L.E.E.P., an A.E.R.E. report, by D. J. Littler and E. E. Lockett. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Sep 1952. 17p graph, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 108337

By measuring the thermal neutron absorption cross-section of sodium on the G.L.E.E.P. oscillator, and by irradiating samples of sodium carbonate at the centre of G.L.E.E.P., and subsequently determining the absolute β activity of these samples, an absolute thermal neutron density at the centre of the pile has been measured. This neutron density can be reproduced accurately by measuring the current from a boron coated ion chamber situated near the centre of the pile. The density is at present expressed in terms of the thermal neutron absorption cross-section of a particular sample of boron. An absolute measurement of this cross-section is being made, but has not yet been completed. The accuracy of the density determination is + 4%, but this error will have to be increased statistically by the error on the determination of the boron cross-section. The thermal neutron density which can be provided covers the range of approximately 10 n/cm^3 to 2 x 10^4 n/cm^3. HD. 763. S. O. code no. 70-674-1-00. AERE N/M41, amended.

Method of measuring the average energy of a neutron spectrum in the range 0.3 to 3.0 M.e.v., an A.E.R.E. report, by Mrs. M. E. Mandl. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Aug 1952. 13p diagr, graphs, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 108341

This report describes a method of measuring the average energy of a neutron spectrum for the energy range of about 0.3 to 3.0 M.e.v. with an accuracy of about 20%. The average energy is deduced from the shape of the induced thermal neutron spatial distribution in a sphere of paraffin. Where time and space allow, and where very great accuracy is not necessary, e.g. in animal irradiation experiments with M.e.v. neutrons, this method has considerable advantages from its simplicity. The method has been checked experimentally at energies of 0.6 M.e.v. and 2.9 M.e.v. where it is in good agreement. S. O. code no. 70-674-1-03. AERE T/R 1008.

Phase debunching by focussing-foils in a proton linear accelerator, an A.E.R.E. memorandum, by J. S. Bell. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Sep 1952. 12p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 108339

The statistical variation of energy loss of particles traversing focussing-foils in a Berkeley type accelerator leads to phase debunching. A treatment of the effect is developed which is based on an analysis by Landau of straggling in single foils. The method is valid for small bunches. Calculations are done for a 47-470 MeV. machine with operating wavelength 1.5 metres, energy gradient 2.3 Mev. per metre, and synchronous phase 20^o. With 3 x 10^{-4} inch beryllium foils the final bunch width is quite tolerable, being of the order of a few degrees. The foils may be somewhat thicker without affecting the overall bunch width, but it varies inversely with the square root of the wavelength. S.O. code no. 70-674-1-04. AERE T/M 68.

Zeeman effect in microwave molecular spectra, by C. K. Jen. Harvard University. Cruft Laboratory. Jul 1948. 32p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108410

A microwave cavity spectroscope is described, which possesses a high sensitivity and resolution for the observation of the Zeeman effect of molecular absorption lines in the microwave frequency range. The theory of operation for this spectroscope and the criteria for sensitivity are formulated. The Zeeman effect of a number of microwave spectral lines has been measured for the gas molecules $N^{14}H_3$, $N^{15}H_3$ and CH_3Cl^{35} and observed for CH_3Cl^{37} and SO_2. All the experimental results obtained so far can be satisfactorily explained by the ϕ combined magnetic contribution due to nuclear and molecular g-factors, if there exists a spin-rotation coupling, or solely by the magnetic contribution due to molecular rotation, if there is no such coupling. Thus, further knowledge of the nuclear and molecular magnetic properties of molecules can be obtained through the examination of the Zeeman effect in microwave absorption spectra. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 51.

PSYCHOLOGY

Comparison of mental practice and physical practice in the learning of physical skills, by S. F. Harby. Pennsylvania State College, State College, Pa. Jun 1952. 13p photos, table Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.50. PB 111094

Contract N6onr-269.
1. Motion pictures, Educational 2. Psychology, Applied 3. SDC 269-7-27.

Electromaze performance of graduate students in physics and American studies, by Haym Kruglak. Minneosta. University. Physics Dept. Dec 1952. 15p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108601

Technical report no. 3. Contract N8onr-66213, Project NR-192-041.
1. Psychological tests.

Psychiatric screening of flying personnel. VI: Anxiety and reactions to stress, by W. H. Holtzman and M. E. Bitterman. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Dec 1952. 31p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108276

The available psychological and medical literature on anxiety and reactions to stress is reviewed and evaluated and recommendations made for application to the research program on psychiatric selection of flying personnel. The practical application of this research is to the measurement and prediction of incapacitating emotional conditions which are precipitated by the stress of combat and anticipation of combat. These conditions are here designated under the term anxiety. The major topics covered are: anxiety reactions in military personnel, psychometric studies, stress tests, physiological concomitants of emotional disturbance, and anxiety and learning. The bibliography contains 263 references. Contract no. AF33(038)-13887. AAF SAM Proj 21-37-002, Report no. 6.

Psychiatric selection of flying personnel. V: Human-figure drawing test as an objective psychiatric screening aid for student pilots, by Anne Anastasi. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Oct 1952. 33p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108275

A Draw-a-Person Test, administered to entering student pilots as part of the Randolph Field Battery of experimental psychiatric screening tests, was analyzed experimentally using an objective scoring check-list devised by the authors. A provisional list of items, discriminating between 50 well-adjusted-pass and 50 maladjusted-fail cadets, failed to discriminate significantly between two similar groups in a second, independent sample. The results, therefore, fail to support the use of the draw-a-person technique when analyzed by the present checklist method. Contract no. AF41(128)-45. AAF SAM Proj 21-37-002, Report no. 5.

Research on scoring methods for the U. S. Navy vocational interest inventory, by Kenneth E. Clark, under Contract with the Office of Naval Research, Project N6ori-212, Task order III, Project designation no. 151248. Minnesota. University. Dept. of Psychology. Nov 1952. 23p tables Available from University of Minnesota. Dept. of Psychology, Minneapolis, Minn. PB 108158

Technical report no. 5.
1. Personnel, Naval - Classification 2. Personnel, Naval - Selection 3. Psychological tests - Rating scales 4. Ability tests 5. Strong Vocational Interest Blank 6. Kuder Preference Record 7. Kuder-Richardson methods (Psychological tests) 8. U. S. Navy Vocational Interest Inventory.

Review of research on psychiatric screening for the armed forces, by Avis Duncombe. U. S. Research and Development Board. Committee on Human Resources. Sep 1952. 21p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108324

Aaron B. Nadel, Executive director.
1. Psychiatric tests 2. Psychiatric tests - Bibliography 3. RDB HR 202/1.

Spectral density study of tracking performance. Franklin Institute, Philadelphia, Pa. Contract no. AF33(038)-10420.

Part 1: Effect of instructions, by Ezra S. Krendel. Jan 1952. 22p photo, diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108296

Quantitative information about human frequency response functions in the control of a piloted aircraft would provide a rational basis for stability and control criteria. Were the pilot a linear, time invariant system, the ratio of the spectral densities of his output signal to his input signal would be the square of the transfer function describing the pilot. In addition, the computation of these spectral densities affords valuable insights into the response process under study. In an effort to examine the invariance of human system parameters an attempt was made to change an operator's tracking responses by using two different sets of instructions for the tracking of the same statistical input. Two subjects were used in a simple compensatory position tracking device. Although the amplitude response characteristics do not conclusively prove or disprove the invariance of the response patterns, the special densities of the signals provide insight into the manner in which the type of instructions affected the response. The value of future research is indicated. AAF WADC TR 52-11, part 1.

Part 2: Effects of input amplitude and practice, by Ezra S. Krendel. Jan 1952. 22p photo, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108385

Quantitative information about human frequency response functions in the control of a piloted aircraft would provide a rational basis for stability and control criteria. Were the pilot a linear, time invariant system, the ratio of the spectral densities of his output signal to his input signal would be the square of the transfer function describing the pilot. Using two subjects in a simple tracking task, the amplitude part of the frequency response has been computed for sta-

tistical inputs of two different mean amplitudes and for two different stages of practice. The foregoing conditions would, it was hoped, indicate whether a rough linear time invariant approximation could be used to describe the tracker's behavior. The results indicate the need for further research, but they are not conclusive in themselves. AAF WADC TR 52-11, part 2.

Two-dimensional electronic pursuit apparatus, by C. E. Warren, A. B. Fontaine and J. R. Clark. U. S. Air Training Command. Human Resources Research Center. Perceptual and Motor Skills Research Laboratory, Lackland Air Force Base, San Antonio, Texas. Aug 1952. 88p photos, diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.75, Photostat $11.25. PB 108295

Contract no. AF33(038)-10528. Project no. 509-020-0004.
1. Tracking - Testing equipment 2. Tracking, Two-dimensional - Tests 3. Motor reactions - Tests 4. Psychological tests - Equipment 5. Ohio State University Research Foundation, Columbus, Ohio 6. AAF HRRC RB 52-26.

STRUCTURAL ENGINEERING

Brandförsök med fönster (Fire resistance tests on windows), by Göte Larsson. Sweden. Statens Provningsanstalt, Stockholm. 1952. 23p photos, graphs, tables (Text in Swedish) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108362

Summary in English.
1. Windows - Fire resistance - Tests - Sweden 2. Glass, Wire mesh - Tests - Sweden 3. Sweden. Statens Provningsanstalt, Stockholm. Meddelande 108.

Bending of pretwisted beams, by J. Zickel. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Aug 1952. 21p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108591

The general theory of pretwisted beams and columns is applied to the bending of an initially straight and uniformly pretwisted beam of doubly symmetric thin-walled section. Pretwisting brings planes of various bending stiffness into play with a resulting stiffness which in a sense averages the stiffness of the beam in its principal directions. It is shown that compared with bending of an untwisted beam in its most flexible direction a thin strip can have its deflection in the plane of bending reduced 72% by an initial twist of 0.83 π. Simultaneously, however, lateral deflections of almost equal magnitude are induced. For pretwists above 2 π, the lateral deflections become practically negligible and the deflections in the plane of bending are still reduced as much as 44%. With increasing initial twist, however, the pretwisted beam becomes more flexible, and for an initial twist of 6.5 π it is as flexible as the untwisted beam in its most flexible direction. Beams of equal flexibility in all directions simply become more flexible with initial twist, a fact which corresponds to the observations made by Den Hartog in some of his experiments. Contract N7onr-35801, T. O. I, NR-041-032. GDAM A11-77. GDAM TR77.

Control of lichens, moulds and similar growths on building materials. Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Station, Watford, England. 1952. 4p table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.10. PB 108352

S. O. code no. 72-22-0-47.
1. Building materials - Control of fungous growths - Gt. Brit. 2. Molds - Prevention - Gt. Brit. 3. Fungicides - Evaluation - Gt. Brit. 4. Lichen - Prevention - Gt. Brit. 5. Lumber - Control of fungous growths - Gt. Brit. 6. DSIR BRD 47.

General theory of limit design, by William Prager. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Oct 1952. 13p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108124

Contract N7onr-35801, T. O. I, NR-041-032.
1. Stability, Structural - Limit analysis 2. GDAM A 11-80/13 3. GDAM TR80.

Limit analysis and design, by William Prager. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Nov 1952. 15p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108594

Many problems concerning limit analysis and limit design of reinforced concrete beams and frames can be treated geometrically in terms of the safe domain in load space. The procedure is illustrated by a typical example. Contract N7onr-35801, T. O. I, NR-041-082. GDAM A 11-83/15. GDAM TR83.

Special investigation to develop a general method for three-dimensional photoelastic stress analysis, by M. M. Frocht and R. Guernsey, Jr. U. S. National Advisory Committee for Aeronautics. Dec 1952. 60p photos, diagrs, drawings, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108173

1. Strain measurement - Methods 2. Stress analysis 3. Stresses, Photoelastic - Three-dimensional 4. Photoelasticity 5. Illinois Institute of Technology, Chicago, Ill. 6. NACA TN 2822.

TEXTILES AND TEXTILE PRODUCTS

Determination of dodecyl dimethyl benzyl ammonium naphthenate in textile materials, by Grace R. F. Rose and C. H. Bayley. National Research Council of Canada. Nov 1952. 8p table Available from National Research Council of Canada, Ottawa, Canada. $.10. PB 108598

1. Eosin test 2. Nuodex 100 (Trade name) 3. Ammonium compounds, Quarternary (Benzyldodecyldimethyl-naphthenate) - Canada 4. Ammonium compounds, Quarternary - Use as textile aids - Canada 5. Textiles - Fungus proofing - Canada 6. Textiles - Tests - Canada 7. NRCC 2875.

Educational order trial on 10.5-ounce shrink resistant wool flannel shirting, by Louis I. Weiner and Frank J. Rizzo. U. S. Office of the Quartermaster General. Research and Development Division. Textiles Clothing and Footwear Branch. Sep 1952. 26p graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.75. PB 111105

A summary is given of the success achieved in the Quartermaster Corps' educational procurement of shrink-resistant shirting. This small-scale run, participated in by many finishers and producers of shrink-resistant compounds, proved the feasibility of treating this particular fabric for shrink resistance and also afforded contractors an advance opportunity to learn by actual experience the production problems involved. The report emphasizes the difficulties encountered, especially as to stiffness, aging, shade, and colorfastness. The results show the quality level met by each contractor (represented by code designation) for each pertinent characteristic. QMC TSR 76.

Reports on synthetic fibers. Vereinigte Glanzstoffabriken A. G., Obernburg, Germany. 1937-1938. 790f Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.00, Enlargement Print $103.75. PB 74180

It contains research reports concerning the production of viscose and related problems, and some abstracts of lectures in the same field. Individual items, available as enlargement prints, are listed below. Please give PB and frame numbers when ordering individual reports. In German. FIAT Microfilm Reel D 296, Frames 6169-6958.

Frames	Title	Price
6169-6181 6189-6196	Research on titanium dioxide as deadening agent. By Riedemann. 1938.	$5.00
6182-6188	Improvement of the Breslau double drying process. By Wachtendorf. 1938. Poorly legible.	2.50
6189-6196	See Frames 6169-6181 (above).	
6197-6205	Increase of the control sensitivity of electrically controlled air conditioning systems. By Fabricius. 1938.	$2.50
6206-6213	Investigation of "Solka Alpha C" cellulose. By Kastelein. 1938.	2.50
6214-6225 6233-6242	Research on titanium dioxide as deadening agent. By Riedemann. 1938.	5.00
6226-6232	The formation of calcium carbonate craters inside of spinnerets of viscose containing turpentine. By Bredee. 1938.	2.50
6233-6242	See frames 6214-6225 (above).	
6243-6248	Washing the cake in the rotating pot. By Bredee. 1938.	2.50
6249-6259	Overcoming filtration difficulties. By Jung. 1938.	2.50
6260-6290	"Dithizon" (diphenylthiocarbazone) and its uses in analytical chemistry. By von Spiegel. 1939.	6.25
6291-6295	Corrosive effect of cone covers. By Loot. 1938.	1.50
6296-6299	The viscose spinning process. By Schramek. 1938. Abstract.	1.50
6300-6308A	Research on titanium dioxide as deadening agent. By Riedemann. 1938.	2.50
6309-6318	Oiling spool rayon with oil emulsions. By Bouman. 1938.	2.50
6319-6325	Weaving tests with shrunk cones from Kelsterbach, Obernburg and Elsterberg. 1938.	2.50
6326-6331	Production of dull economy-viscose. By Kastelein. 1938.	1.50
6332-6352	Determination of the coefficient of friction of rayon threads. By Bouman. 1938.	5.00
6353-6369B	Weaving rayon by the Elsterberg method of 1937. By Winkler. 1938.	3.75
6370-6389	Excerpt from a lecture by Jayme. 1937. On processing of cellulose.	3.75
6390-6395	Borax as a buffer for bleaching baths. By Richter. 1937-1938. Translation from the English.	1.50
6396-6409 6413-6417	Beechwood cellulose. By Mehner. 1937.	3.75

Frames	Title	Price
6410-6412	Experiments concerning the stability test. By Schultz. 1937.	$1.50
6413-6417	See Frames 6396-6409 (above).	
6418-6421A	Storage of salt, and recovery of brine, for "Permutit" water softeners. 1937. Translation from the English.	1.50
6422-6431	Investigation of "Corona" cellulose. By Kastelein. 1937.	2.50
6432-6440	Spinning under proper conditions of ripening. By Kastelein. 1937.	2.50
6441-6459	The effect of its ripeness on the possibility to dye viscose. By Kayser. 1937.	3.75
6460-6478	The alterations of the swelling volume of cellulose during technical processes. By Jayme. 1937.	3.75
6479-6481	60° Bé sulfuric acid. By Baumgürtel. 1937.	1.50
6482-6546	Testing of weaving rayon. By Pieper. 1937.	7.50
6547-6552	The effect of lauryl pyridinium chloride on the quality of glossy and dull rayon. By Bredée. 1937.	1.50
6553-6558	The solubility of cellulose in caustic soda solutions. By Christoph. 1937.	1.50
6559-6569	Superficial dyeing. By Wachtendorf. 1937.	2.50
6570-6578	Experiments on dull viscose from "Novocell." By Kastelien. 1937.	2.50
6579-6589	Electric measurements of thread tensions and their registration. By Gonsalver. 1937.	2.50
6590-6604	Superficial dyeing. By Heim. 1937.	3.75
6605-6613A	The wear of thread guides. By Bouman. 1937.	2.50
6614-6621	The spinning of rayon with titer variations. By von Hoek. 1937.	2.50
6622-6660	Summary on "Mira" baths. By Crosswell. 1937.	6.25
6661-6664	The ripening process of glossy economy-viscose from Arnhem and Ede. By Kastelein. 1937.	1.50
6665-6694	Dyeing of viscose rayon on cross spools." By Dokkum. 1937.	$5.00
6695-6698	Sapphire thread guides of cone machines. By Vergouwe. 1937.	1.50
6699-6751	Diminution of the sodium hydroxide content of viscose (economy-viscose). 1937.	8.75
6752-6761	Wear of spinning funnels. By Meerdink. 1937.	2.50
6762-6788	Crepe experiments. By Kalff. 1937.	5.00
6789-6795	Investigation of cellulose. 1937.	2.50
6796-6813	Research in St. Pölten. By Kalff. 1937.	3.75
6814-6815	Spinnability of liquids. By Erbring. 1937. Abstract.	1.50
6816-6837	Research on titanium dioxide as deadening agent. By Riedemann. 1937.	5.00
6838-6841	Improvement of cellulose. By Jayme. 1937. Abstract.	1.50
6842-6849	Research on the determination of shrinkage. By Schultz. 1937.	2.50
6850-6858	Preventing the formation of pointed ends. By Dokkum. 1937.	2.50
6859-6868	Investigation of cellulose. By Kasteleim. 1937.	2.50
6869-6872	Systematic investigation of the shrinkage properties of cord rayon. By Lappe. 1937.	1.50
6873-6882	Increase of the cellulose content of "Rt" viscose. By Elssner. 1937.	2.50
6883-6888	Duplication of a part of the preceding item.	
6889-6902	"Rt" viscose. By Elssner. 1937. In German. Almost illegible. "Rt" probably is "Ragnit."	3.75
6903-6934 6949-6958	Spinning experiments with "Rt" viscose. By Elssner. 1937-1938.	6.25
6935-6948	The behavior of viscose solutions from "Ragnit" and high grade sulfate cellulose at various concentrations of cellulose and alkali. By Elssner. 1938.	3.75
6949-6958	See Frames 6903-6934 (above).	

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Convection of a pattern of vorticity through a shock wave, by H. S. Ribner. U. S. National Advisory Committee for Aeronautics. Jan 1953. 48p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108523

1. Wind tunnels, Supersonic - Turbulence 2. Flow, Supersonic - Turbulence 3. Aerodynamics, Supersonic - Research 4. Vortex motion - Theory 5. U.S. Lewis Flight Propulsion Laboratory, Cleveland, Ohio 6. NACA TN 2864.

Development of a check list to study job tasks performed by B-29 airplane and engine mechanics, by Guy G. Besnard. U. S. Air Training Command. Human Resources Research Center. Technical Training Research Laboratory, Chanute Air Force Base, Illinois. Nov 1952. 17p diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108527

Project no. 507-012-0003.
1. Mechanics, Aeronautical - Classification 2. Engineers, Aeronautical - Classification 3. Personnel, Flying - Classification 4. Job classification 5. B-29 (Airplane) 6. AAF HRRC RB 52-31.

Electromagnetic resonance phenomena in aircraft structures, by A. S. Dunbar. Stanford Research Institute. Aircraft Radiation Systems Laboratory, Stanford, Calif. May 1950. 31p photos, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108241

A method for determining the resonant frequencies of a given aircraft structure by measurement of back-scattering from a scale model is described. The experimental procedure consists of measuring the standing-wave ratio as a function of frequency at the terminals of a matched antenna used to illuminate the model. Maxima in the standing-wave-ratio versus frequency curve indicate resonant frequencies. Results for typical aircraft structures are presented, showing that the edges of the airfoil surfaces, as well as other parts of the aircraft structure, enter into the resonance phenomena. Also included are a series of measurements of particular interest in simplified modeling which compare the resonant frequencies of a model having a cylindrical fuselage, the equivalent flat strip model, and the complementary slot. Technical report no. 8, SRI project no. 188. Contract no. AF19(122)78.

Engineering handbook series for aircraft repair: United States and British Commonwealth of Nations aircraft metals. U. S. Air Force and U. S. Bureau of Aeronautics. Feb 1946. 255p photos, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.00, Photostat $32.50. PB 46893r

Complete revision of PB 46893.
1. Aircraft - Maintenance and repair 2. Aircraft - Materials - Metals 3. Metals - Hardness tests 4. Metals - Inspection 5. Aluminum alloys 6. Magnesium alloys 7. Steel alloys 8. AN 01-1A-9 revised.

Estimated power reduction by water injection in a nonreturn supersonic wind tunnel, by Morton Cooper and John R. Sevier, Jr. U. S. National Advisory Committee for Aeronautics. Jan 1953. 19p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108522

1. Mach number - Effect 2. Heat - Transference - Aerodynamics 3. Wind tunnels, Supersonic - Equipment 4. Wind tunnels, Supersonic - Effect of condensation 5. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 6. NACA TN 2856.

Ground handling of aircraft. U. S. Air Force. Jun 1952. 5p diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 46583r

Revision of PB 46583.

Helicopter behaviour in the vortex ring conditions, by Wm. Stewart. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Nov 1951. 14p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 108204

Cover date is 1952. C. P. no. 99. Technical note no. Aero. 2131. S. O. code no. 23-9006-99.
1. Helicopters - Rate of vertical descent - Gt. Brit. 2. Flow, Turbulent - Theory - Gt. Brit. 3. Vortex motion - Theory - Gt. Brit. 4. Sikorsky R-4B (Helicopter) 5. Sikorsky R-6 (Helicopter) 6. Sikorsky S-51 (Helicopter) 7. Bell 47 (Helicopter) 8. Bristol 171 (Helicopter) 9. ARC CP 99.

Investigation utilizing an electrical analogue of cycle de-icing of a hollow steel propeller with an external blade shoe, by Carr B. Neel, Jr. U. S. National Advisory Committee for Aeronautics. Dec 1952. 54p photos, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108387

1. Propellers - De-icing 2. Propeller blades - Shoes - Design 3. U. S. Ames Aeronautical Laboratory, Moffett Field, Calif. 4. NACA TN 2852.

Load diffusion at an interspar opening: Theoretical methods of analysis compared with strain measurements on a large wing, by D. C. Allen. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jun 1948. 26p diagrs (1 fold) graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.70. PB 108302

The diffusion of load from spar flanges into skin and stringers near an opening was investigated experimentally in a large wing structure undergoing strength tests. A comparison of measured strains with those given by theoretical methods shows that in general the flange loads are represented with reasonable accuracy. Any theory, however, in which the chordwise rib at the edge of the opening is ignored gives shear stresses much greater than those measured. Allowance for the bending stiffness of this rib produces values of shear stress comparable with those obtained experimentally. Cover date is 1952. S. O. code no. 23-2664. ARC RM 2664.

Model tests with flow on the Gloster F.9/40 with H.L. nacelles (Meteor II), by J. S. Thompson, C. M. Fougère and E. G. Barnes. Gt. Brit. Ministry of Supply. Aeronautical Research Council. May 1943. 17p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New Yokr 20, N. Y. $1.25. PB 108298

Cover date is 1952. S. O. code no. 23-2517.
1. Flow, Jet mixing - Gt. Brit. 2. Wind tunnel tests - Gt. Brit. 3. Stability, Longitudinal - Effect of tail - Gt. Brit. 4. Gloster F. 9/40 (Airplane) 5. Model testing - Gt. Brit. 6. Meteor II (Airplane) 7. Airplanes - Models - Tests - Gt. Brit. 8. Nacelles, Engine - Load distribution - Gt. Brit. 9. Tail surfaces - Stability - Gt. Brit. 10. ARC RM 2517.

Numerical solution of two-dimensional fluid motion in the neighbourhood of stagnation points and sharp corners, by L. C. Woods. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Oct 1949. 12p diagrs, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.90. PB 108305

Methods are given in this paper of dealing with singularities of functions satisfying certain two-dimensional partial differential equations. For a numerical solution the differential equations are replaced by difference equations on a square mesh. Log (1/q) where q is the velocity, becomes infinite at stagnation points, sharp corners, sinks, etc., while the conjugate function θ (flow direction) becomes multivalued. The method consists in finding a series expansion for the function (log 1/q or θ) in the neighbourhood of the singularity. This expansion is then used to find relationships between the function values at points of the mesh adjacent to the singularity. A method of working directly in the transformed flow plane (in which the aerofoil is a slit), and thus avoiding irregular squares on the boundary, is also given. The method is developed for incompressible flow, but an approximation suitable for compressible flow is given. Cover date is 1952. S. O. code no. 23-2726. ARC RM 2726.

Ob ustanovivshikhsya kolebaniyakh kryla krugovoi formy v plane. (Steady vibrations of wing of circular plan form). Teoriya kryla konechnogo razmakha krugovoi formy v plane. (Theory of wing of circular plan form), by N. E. Kochin. Jan 1953. 93p diagrs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108430

Translation from Prikladnaya Matematika i Mekhanika, Vol. VI, 1942, p. 287-316; Prikladnaya Matematika i Mekhanika, Vol. IV, no. 1, 1940, p. 3-22.
1. Wings, Circular - Vibration - Russia 2. Wing theory - Russia 3. Wings, Circular - Aspect ratio - Russia 4. Wings, Circular - Flutter - Russia 5. Wings, Circular - Loads - Russia 6. Stability, Static - Tests - Russia 7. Stability, Dynamic - Tests - Russia 8. U. S. National Advisory Committee for Aeronautics 9. NACA TM 1324.

Planning characteristics of a surface having a basic angle of dead rise of 40°and horizontal chine flare, by Ulysse J. Blanchard. U. S. National Advisory Committee for Aeronautics. Dec 1952. 26p photo, diagrs, graph, table Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108268

1. Seaplanes - Hulls - Length beam ratio 2. Seaplanes - Planing surfaces 3. Seaplanes - Dead rise 4. Seaplanes - Hydrodynamics 5. Hydrodynamics 6. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 7. NACA TN 2842.

Power-off flare-up tests of a model helicopter rotor in vertical autorotation, by S. E. Slaymaker and Robin B. Gray. U. S. National Advisory Committee for Aeronautics. Jan 1953. 36p photos, drawings, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108524

1. Helicopter blades - Autorotation 2. Helicopters - Rotors - Models - Tests 3. Helicopters - Rotors - Rate of vertical descent 4. Princeton University, Princeton, N. J. 5. NACA TN 2870.

Section characteristics of a 10.5-percent-thick airfoil with area suction as affected by Chordwise distribution of permeability, by Robert E. Dannenberg and James A. Welberg. U. S. National Advisory Committee for Aeronautics. Dec 1952. 52p photos, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108269

1. Wing profiles - Lift 2. Airfoils - Lift 3. Boundary layer - Control 4. Wings - Boundary layer 5. Materials, Aircraft - Porosity 6. Airfoils - Boundary layer - Suction effect 7. U. S. Ames Aeronautical Laboratory, Moffett Field, Calif. 8. NACA TN 2847.

Shock tube theory and applications, by J. Luckasiewicz Canada. National Aeronautical Establishment. 1952. 82p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington

25, D C. Microfilm $3.75, Photostat $11.25. Available for exchange from National Aeronautical Establishment, Montreal Road, Ottawa, Canada.
PB 108289

The theory of shock tube flow is presented in a form convenient for the aerodynamic design of shock tubes. Tables and graphs of the required functions, covering the whole range of values of the specific heat ratio, are included. Application of shock tubes to investigation of compressible flow is examined. In particular, the use of shock tubes as sub— and supersonic tunnels, as aeroballistic ranges (including hypersonic speeds) and for investigation of propagation of continuous waves, shocks (including variable specific heat and relaxation time effects) and interactions is considered. Flow in a shock tube which consists of two sections of different cross-sectional area, the section initially under higher pressure being the large one, is considered on the assumptions of one-dimensional motion. It is shown that quasi-steady flows and shocks of a given Mach number are produced with an initial pressure ratio about one-third smaller than that required in a uniform cross-section shock tube. The length of the higher pressure tube section for a given duration of quasi-steady flow behind the contact surface is about 8 percent smaller. Information in this report was published Jan 1950 as Report MT-10 and MT-11 of the Division of Mechanical Engineering, National Research Council. NAEC R 15.

Some preliminary results from V-g recorders installed in military and civil aircraft, by R. Hain Taylor. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Dec 1946. 43p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $2.85.
PB 108299

During the latter half of the 1939-45 war, V-g recorder slides were collected from a number of operational and training aircraft types, and about April, 1944, the scope was widened to include some commercial transport aircraft. A number of the results has been given limited circulation as Aeronautical Research Council papers, from heavy bombers in October, 1943, from fighters in January, 1944, and from twin-engined aircraft in April, 1944, and a summary of readings from commercial aircraft in 1946; this Report collects these scattered results into one body. Part I outlines the method of collection of the slides, describes the nature of the readings obtained, and their method of presentation, and discusses the results. These are grouped roughly into classes, as heavy bombers, fighters, twin-engined aircraft, training aircraft and commercial transport aircraft, and the possibilities of comparison between different types performing the same role, and between different roles performed by the same basic type, are indicated. Part II is a theoretical consideration of possible methods of analysis and extrapolation; it is pointed out that as the work has developed, first ideas have been enlarged or superseded, and finality is still far off. The advantages and disadvantages of several methods used up to 1946 are discussed, and suggestions are made for subsequent work. Cover date is 1952. S. O. code no. 23-2610. Contents: Part I: Method of collection of the slides. - Part II: Methods of analysis. - Appendix I: Description of V-g recorder and its use. - Appendix II: Illustrations taken from a V-g recorder slide. ARC RM 2610.

Study of the application of power spectral methods of generalized harmonic analysis to gust loads on airplanes, by Harry Press and Bernard Mazelsky. U. S. National Advisory Committee for Aeronautics Jan 1953. 48p graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108481

1. Airplanes - Gust loads 2. Harmonic analysis 3. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 4. NACA TN 2853.

Untersuchungen an einem flügel mit hinter-kantenabsaugung (Investigation of a wing with trailing edge suction), by B. Regenscheit. Aerodymische Versuchsanstalt Göttingen E. V. Institut Windkanäle, Göttingen, Ger. May 1942. 67p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 36172t

Translated by United Aircraft Corporation, East Hartford, Conn. Aug 12, 1947. Translation of PB 36172.
1. United Aircraft Corp., East Hartford, Conn.
2. ZWB FB 1594, translation.

Velocity distribution on straight and swept-back wings of small thickness and infinite aspect ratio at zero incidence, by S. Neumark. Gt. Brit. Ministry of Supply. Aeronautical Research Council. 1947. 40p photo, diagrs, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $2.40. PB 108304

A solution by H. Ludwieg, giving the velocity distribution in the central section of a thin swept-back wing of infinite aspect ratio with a biconvex profile at zero incidence, has been found erroneous. In connection with this problem, the approximate method of sources and sinks for determining velocity distribution on straight and swept-back wings is critically examined, its limitations established, and proper ways of its application to three-dimensional problems indicated. A correct solution of Ludwieg's problem is found, and generalized to give the velocity distribution over the entire wing. The method is further extended to cover a wide class of thin symmetrical wing profiles, those with rounded leading edge being, however, often intractable by this particular method. The ultimate purpose of the investigation is to provide a reliable basis for determining the critical Mach number for swept-back wings. Further work is needed to embrace wings of finite aspect ratio and tapered wings, in particular delta-wings. The method seems adequate to deal with these more complex cases. Cover date is 1952. S. O. code no. 23-2713. ARC RM 2713.

Instruments

Assessment of the probable causes of variation of the speed correction coefficient of aircraft ther-

mometers, by D. D. Clark. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Sep 1951. 17p diagrs, graph, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.00. PB 108203

Cover date is 1952. M. R. P. 677. S. O. code no. 23-9006-91.
1. Thermometers, Aircraft - Speed correction coefficient - Gt. Brit. 2. Flying, High speed - Meteorology - Gt. Brit. 3. Air - Temperature - Gt. Brit. 4. ARC CP 91.

Effects of brightness and color of illumination on performance of a complex perceptual-motor task (flying a Link trainer), by S.D.S. Spragg and Joan Kanwisher. Rochester. University. Dept. of Psychology. Jul 1952. 18p diagr, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 108487

This report describes experiments which measured performance in flying a Link Instrument Trainer as a function of the brightness and color of the illumination provided. Performance was measured in terms of deviations from the calculated perfect course in altitude, compass heading, air speed, and vertical speed. The results showed color of illumination to be an unimportant variable in this task, provided that the colors used were equated for brightness. As for brightness, each of the three experiments yielded superior performance at the higher brightnesses but the differences were in several instances not statistically significant, due chiefly to variability in performance of the task and to variability due to the instrument. It is concluded that the results in general corroborate previous findings from this project with respect to dial reading performance as related to illumination variables. Contract no. W33-038-ac-18317. AAF WADC TR 52-203.

Factors affecting legibility of digits, by Harold B. Schapiro. Rochester. University. Dept. of Psychology. Jun 1952. 22p diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108486

This study was concerned with the manner in which the legibility of single digits (as measured by speed of reading) is affected by the interactions of the following variables: level of illumination, style of digit, and ratio of stroke-width to over-all height of digit. Illumination levels used were: 0.011, 0.044, 0.145, and 0.975 foot-lamberts. Digit styles were: AND 10400, Berger, Craik, and Mackworth. Stroke width - height ratios were: 1:5, 1:6.25, 1:8, and 1:10. Twelve subjects with good vision each read 3200 digits in a factorially designed experiment. Analysis of the results showed that: (1) in the determination of legibility, level of illumination was the most important factor studied in this experiment; there was a marked improvement in performance from 0.011 to 0.044 foot-lamberts, but relatively little additional change for brightness levels higher than this; (2) the Mackworth digits were the most legible with the AND 10400 digits a very close second; (3) ratios of 1:5 and 1:6.25 were superior to others tested; and (4) except for illumination level, differences between subjects were more important than any other source of variability in the experiment. Contract no. AF33(038)-18317. AAF WADC TR 52-127.

USAF supply catalog, Class 05-F, code 2200: Aircraft automatic pilots and gyro control mechanisms and maintenance parts. U. S. Air Force. Jun 1952. 238p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $8.25, Photostat $30.00. PB 108380

Basic issue. Replaces USAF supply catalog S-05-F dated 22 October 1950, revised 21 October 1951 and 22 April 1952.
1. Pilots, Automatic - Maintenance and repair 2. Pilots, Automatic - Parts 3. Gyro controls - Maintenance and repair 4. Gyro controls - Parts 5. AAF SL S-05-F.

Engines and Propellers

Aircraft power plant fire protection. Final report under Contract no. W-33-038-ac-8489, by Frank B. Allen. C-O-Two Fire Equipment Co., Newark, N. J. Feb 1948. 263f photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.00, Enlargement Print $36.25. PB 108616

A report is presented which was prepared to provide information necessary for the design of practicable, effective aircraft fire extinguishing systems and techniques and to assist in the development of improved fire prevention and detection methods. Tests were made of various types of fire extinguishing systems using different types of agent distribution, different rates of application, and various agents, including at least one carbon dioxide system, one methyl bromide system, and one monochlorobromomethane system. Tests were made to determine suitability of protection of the power zone by means of fuel and oil shut-off valves and any minor design changes, such as drainage without the use of extinguishing agents. Tests were made to determine the most suitable means of fire detection and warning. Careful investigation was conducted of any preventive design measures which were determined to be of value as a result of these tests. Specific recommendations are stated.

Icing protection for a turbojet transport airplane: Heating requirements, methods of protection, and performance penalties, by Thomas F. Gelder, James P. Lewis and Stanley L. Koutz. U. S. National Advisory Committee for Aeronautics. Jan 1953. 58p drawings, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108483

1. Airplanes, Jet propelled - Icing protection 2. Airplanes, Jet propelled - Heating systems 3. Heat - Transference 4. Jet engines, Turbo-jet - Ice for-

mation 5. U. S. Lewis Flight Propulsion Laboratory, Cleveland, Ohio 6. NACA TN 2866.

Laminar natural-convection flow and heat transfer of fluids with and without heat sources in channels with constant wall temperatures, by Simon Ostrach. U. S. National Advisory Committee for Aeronautics. Dec 1952. 55p diagr, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108388

1. Flow, Laminar - Heat transfer 2. Heat - Transference - Aerodynamics 3. U. S. Lewis Flight Propulsion Laboratory, Cleveland, Ohio 4. NACA TN 2863.

Part I: Tabulated thermal data for hydrocarbon oxidation products at high temperatures - Part II: The effect of dissociation on rocket performance calculations, by A. B. P. Beeton. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Oct 1946. 14p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.00. PB 108057

Tables are given of the total heat and entropy of H_2O, CO_2, O_2, CO, H_2, OH, O and H for the range of temperature 1500-4000°K. Values are also given for the corresponding equilibrium constants over the same temperature range. The tables have been compiled with a view to their use in calculating the performance of liquid-fuel rockets. Cover date is 1952. S. O. code no. 23-2542. ARC RM 2542.

Aerodynamics

Aerodynamic design of supersonic propellers from structural consideration, by Jerome B. Hammack. U. S. National Advisory Committee for Aeronautics. Dec 1952. 21p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108270

1. Propeller theory 2. Propellers - Design 3. Propellers - Stress analysis 4. Propellers - Speed 5. Mach number - Effect 6. Flow, Supersonic - Pressure distribution 7. Materials, Aircraft - Stress analysis 8. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 9. NACA TN 2851.

Combined effect of damping screens and stream convergence on turbulence, by Maurice Tucker. U. S. National Advisory Committee for Aeronautics. Jan 1953. 63p diagrs, graphs, table Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108577

1. Flow, Turbulent 2. Turbulence, Isotropic 3. Diffusers, Supersonic - Theory 4. Diffusers, Subsonic - Theory 5. Wind tunnels - Turbulence 6. U. S. Lewis Flight Propulsion Laboratory, Cleveland, Ohio 7. NACA TN 2878.

Concerning the annular air intake in supersonic flight, by I. M. Davidson and L. E. Umney. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Aug 1947. 22p photos, drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.40. PB 108301

The stability of an annular air intake at a Mach number of 1.4 and with Reynolds numbers of about 1.5×10^6 is considered in detail and a method is described whereby the experimental results might be extrapolated for preliminary full-scale design purposes. This extrapolation has yet to be checked experimentally, but suggests that a typical aircraft intake would have an overall isentropic efficiency of about 85 per cent. The results also indicate that both the stability and the efficiency of an intake could be improved by controlling the boundary layer on its nacelle, and as an alternative to boundary-layer suction a device which is described as a segregation ring is suggested. This, it appears, might raise the efficiency by some 2 or 3 per cent. Cover date is 1952. S. O. code no. 28-2651. Appendix I is missing. Contents: - Appendix II: Theoretical loss analysis for model E. - Appendix III: Examples of extrapolation. ARC RM 2651.

Conical flow as a result of shock and boundary-layer interaction on a proble, by J. Lukasiewicz. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Sep 1948. 10p photos, diagrs, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 108303

The formation of a conical shock and a conical region of flow separation originating from the tip of a thin traversing tube was observed in a supersonic tunnel as a result of interaction of a strong shock with the boundary layer on the tube surface. The angles of the conical shock and separation surfaces and the static pressure in the separation region are in good agreement with the theoretical conical flow solutions. The extent of the conical flow illustrated should act as a warning against the use of static pressure tubes for measuring pressures in the regions of strong shocks. Cover date is 1952. S. O. code no. 23-2669. ARC RM 2669.

Flow over symmetrical aerofoils without incidence at sonic speed, by Tore R. Gullstrand. Sweden. Kungl. Tekniska Högskolan. Institutionen för Flygteknik. Mar 1952. 39p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 108679

1. Flow, Sonic - Theory - Sweden 2. Flow, Two dimensional - Theory - Sweden 3. Green's theorem 4. Airfoils, Symmetrical - Velocity distribution - Sweden 5. Equations, Integral - Sweden 6. KTH AERO TN 24.

Flow over two-dimensional aerofoils at incidence in the transonic speed range, by Tore R. Gullstrand. Sweden. Kungl. Tekniska Högskolan. Institutionen för Flygteknik. Oct 1952. 25p graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108681

1. Flow, Transonic - Theory - Sweden 2. Airfoils, Two dimensional - Velocity distribution - Sweden 3. Airfoils, Symmetrical - Velocity distribution - Sweden 4. Equations, Integral - Sweden 5. KTH AERO TN 27.

General correlation of temperature profiles downstream of a heated air jet directed at various angles to air stream, by Robert S. Ruggeri. U. S. National Advisory Committee for Aeronautics. Dec 1952. 59p photos, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108271

1. Flow, Turbulent 2. Flow, Jet-mixing 3. Heat - Transference - Aerodynamics 4. U. S. Lewis Flight Propulsion Laboratory, Cleveland, Onio 5. NACA TN 2855.

Spiralförmige bewegungen zäher flüssigkeiten (Spiral motions of viscous fludis), by Georg Hamel. Jan 1953. 44p Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108346

Translation from Deutsche Mathematiker Verereinigung. Jahresbericht 25, 1917, pp. 34-60. Translated by Mary L. Mahler.
1. Flow, Viscous - Theory - Germany 2. Flow, Incompressible - Theory - Germany 3. Equations of motion - Germany 4. U. S. National Advisory Committee for Aeronautics 5. NACA TM 1342.

Unsteady oblique interaction of a shock wave with a plane disturbance, by Franklin K. Moore. U. S. National Advisory Committee for Aeronautics. Jan 1953. 66p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 108578

1. Flow, Turbulent - Theory 2. Flow, Compressible - Theory 3. Shock waves - Computation 4. Shock waves - Refraction 5. U. S. Lewis Flight Propulsion Laboratory, Cleveland, Ohio 6. NACA TN 2879.

Marine Transportation

Developments in submarine and small vessel lighting, by Dean Farnsworth. U. S. Navy. Medical Research Laboratory, Naval Submarine Base, New London, Conn. Sep 1952. 6p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108293

Bureau of Medicine and surgery, Navy Department, Project NM 002 014.02.01. Medical Research Laboratory Report no. 209, Volume XI, no. 26. Preprint no. 30. Paper presented at the National Technical Conference of the Illuminating Engineering Society, Sep. 8-13, 1952, Chicago, Illinois.
1. Illuminating engineering 2. Illumination, Instrument 3. Submarines - Lighting 4. Ships - Lighting 5. Developments in submarine and small vessel lighting 6. NAV MRL 209 7. NMRI Proj NM 002 014.02.01.

Instruction manual, operation and maintenance parts and price list, Gray marine Diesels, Navy high-output models. U. S. Bureau of Ships. Feb 1944. 342f photos, drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.00, Enlargement Print $46.25. PB 108760

1. Engines, Diesel - Marine - Maintenance and repair 2. Engines, Diesel - Marine - Parts 3. Gray Marine Motor Co., Detroit, Mich. 4. Micro NAVSHIPS D1486.

Research on the development of shipboard performance measures. Final report, part I: Use of practical performance tests in the measurement of shipboard performance of enlisted naval personnel, by Clark L. Wilson and Robert R. Mackie. Management and Marketing Research Corporation, Los Angeles, Calif. Nov 1952. 97p photos, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.25, Photostat $12.50. PB 108490

Contract N8 onr 70001. Contractor: Management and Marketing Research Corporation, Los Angeles, Calif. for Psychological Research Center, Los Angeles, Calif.
1. Electricians - Performance - Tests 2. Engineers, Naval - Performance - Tests 3. Submarines - Personnel - Performance 4. Submarines - Electrical operations 5. Submarines - Engines 6. Personnel, Naval - Shipboard performance - Tests 7. Personnel, Naval - Performance - Tests 8. Ability tests 9. Batteries of practical performance tests 10. Psychological Research Center, Los Angeles, Calif.

MISCELLANEOUS

Indexing of Division 18 NDRC reports: Section I: Subject index of projects; Section II: List of research and survey projects; Section III: List of reports. National Research Council. War Metallurgy Committee. Progress report, Nov 1941-Nov 1944, by Ralph H. Phelps. Dec 1944. 102p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.50, Photostat $13.75. PB 108455

This report providing a general index and listing of the research and survey consists of three sections as follows: I. Subject Index of Projects. II. Numerical List of Research and Survey Projects Showing Serial Numbers of Reports on Each. III. Numerical List of Reports. Section I can be used to determine the work done on any specific subject. Section II can be used when the NRC project number is known. Section III can be used when the number or date of the report is known. Contract OEMsr-307. WMC M442. OSRD 4483.

Industrial wastes practices (Proceedings of the fifth National Public Health Engineering Conference) May 20 and 21, 1952. Florida. University. Dept.

of Civil Engineering. Oct 1952. 60p diagrs, map, tables Available from Florida Engineering and Industrial Experiment Station, University of Florida, Gainesville, Fla. PB 108136

Engineering progress at the University of Florida, vol. VI, no. 10. Contents: Magnitude of the industrial waste problem in the southeast, by Lewis A. Young. - Florida industrial waste problems, by John W. Wakefield - Equitable utilization of stream resources by industries, by Earle B. Phelps. - Developments in the disposal of citrus processing wastes, by F. W. Wenzel. - Reduction of organic matter in citrus press liquor by aerated yeast propagation, by M. K. Veldhuis. - Removal of oils, fats and grease from wastes, by F. S. Gibbs. - Investigation of Alafia and Peace Rivers by William R. Clary. - Challenge of industrial waste to the engineer, by Malcolm Pirnie. Kraft mill effluent control practice, by Harry W. Gehm. Discussion by Anthony W. Pesch. - Theory and practice in stream pollution control, by Richard D. Hoak. - Disposal of oil brine wastes, by Harry P. Kramer. - Influence of industrial wastes on sewage treatment, by A. A. Kalinske.
1. Trade waste - Disposal 2. Stream pollution - Prevention 3. National Public Health Engineering Conference, 5th, 1952. 4. F EES B57.

Processing of feathers, by Henry P. Bragg. U. S. Office of Technical Services. Feb 1953. 17p Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.50. PB 111090

1. Feather industry 2. OTS IR 10499.

Quartermaster research on down and feathers and other filling materials for sleeping bags, by Norman E. Roberts and Norman B. Edelman. U. S. Office of the Quartermaster General. Jun 1951. 160p photos, diagr, graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $4.00. PB 111104

1. Sleeping bags - Filling materials 2. Down, Waterfowl - Tests 3. Feathers - Tests 4. QMC TSR 43.

PATENTS

Chemicals and Allied Products

Patent applications in the field of organic chemistry. Reichspatentamt, Berlin. 1932-1945. 991f Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.00, Enlargement Print $117.50. PB 83314

This FIAT microfilm reel contains 222 rejected patent applications and one report, all in the field of organic chemistry. Individual items, available as enlargement prints, are listed below. Please give the above PB and the frame numbers when ordering an individual item. In German. FIAT Microfilm Reel B 200, Frames 4049-5039.

Frames	Title	Price
4049-4053	Process for producing organic compounds containing oxygen. I. G. Farbenindustrie A. G. Ger. patent application I 72 975 dated Aug 15, 1942.	$1.50
4054-4061	Process for hydrogenation of carbon monoxide by means of iron catalysts. Steinkohlenbergwerk Rheinpreussen. Ger. patent application St 63 269 IVd/12o dated Jul 6, 1943.	2.50
4062-4068	Process for producing organic compounds containing oxygen. I. G. Farbenindustrie A. G. Ger. patent application I 72 925 IVd/12o dated Aug 10, 1942.	2.50
4069-4075	Process for producing wetting agents, detergents, and emulsifiers. Henkel und Cie. Ger. patent application H 166 073 IVd/12o dated Aug 14, 1941.	2.50
4076-4079	Process for producing styrene and its homologues. I. G. Farbenindustrie A. G. Ger. patent application 772 627 dated Jun 29, 1942.	1.50
4080-4083	Process for producing hydroxysulfonamides. I. G. Farbenindustrie A. G. Ger. patent application dated May 5, 1942.	1.50
4084-4085	Process for purifying crude ketones. I. G. Farbenindustrie A. G. Ger. patent application I 72 626 dated Jul 2, 1942.	1.50
4086-4087	Process for precipitating cellulose derivatives. I. G. Farbenindustrie A. G. Ger. patent application I 72 175 dated Dec 18, 1942. Supplement to patent application I 65 954 IVc/12o.	1.50
4088-4092	Process for separating oily hydrocarbons from mixtures which also contain solids. I. G. Farbenindustrie A. G. Ger. patent application I 74 438 dated Feb 24, 1943.	1.50
4093-4094	Process for purifying sulfonation products. I. G. Farbenindustrie A. G. Ger. patent application I 74 400 IVd/12o dated Feb 23, 1943. Second supplement to patent application I 71 002 IVd/12o.	1.50
4095-4098	Processing the oil-containing residues of pressure hydrogenation processes. Hydrierwerk Scholven A. G. Ger. patent application H 168 195 dated Apr 23, 1942.	1.50
4099-4105	Process for producing uniform aromatic hydrocarbons. I. G. Farbenindustrie A. G. Ger. patent application I 67 243 dated Jun 21, 1940.	2.50
4106-4110	Process for purifying mixtures of carboxylic acids. Henkel und Cie. Ger. patent application H 169 733 IVd/12o dated Oct 19, 1942.	1.50

Frames	Title	Price
4111-4113	Process for producing crepe paper for nitrations. I. G. Farbenindustrie A. G. Ger. patent application I 77 396 IVc/12o, dated May 13, 1944.	$1.50
4114-4117	Process for chlorination of saturated hydrocarbons. I. G. Farbenindustrie A. G. Ger. patent application I 74 425 dated Feb 24, 1943.	1.50
4118-4120	Sulfonation products. Ger. patent application H 170 218 IVd/12o dated Dec 5, 1942.	1.50
4121-4124	Process for producing dimethyl sulfate. I. G. Farbenindustrie A. G. Ger. patent application dated Jun 24, 1942.	1.50
4125-4128	Process for producing higher fatty acids from higher olefins. Thieme, Carl (Inventor). Ger. patent application dated Sep 5, 1940.	1.50
4129-4130	Process for producing organometal carbonyls. Hein, Franz (Inventor). Ger. patent application H 165 955 IVc/12o dated Jul 29, 1941.	1.50
4131-4134	Process for the selective recovery of fatty acids from the waste liquors of neutralization. Hoesch-Benzin G.m.b.H. Ger. patent application H 168 300 dated May 9, 1942.	1.50
4135-4146	Production of valuable organic compounds by the oxidizing decomposition of polysaccharides. Jayme, Georg (Inventor). Ger. patent application I 70 714 IVd/12o dated Oct 22, 1941.	3.75
4147-4150	Process for producing lactic nitriles. I. G. Farbenindustrie A. G. Ger. patent application I 70 402 IVd/12o dated Aug 24, 1942.	1.50
4151-4154	Process for producing antiknock fuels. I. G. Farbenindustrie A. G. Ger. patent application I 73 305 dated Oct 12, 1942.	1.50
4155-4156	Process for producing lactates of alkaline earths. Chemische Fabrik Joh. A. Benckiser G.m.b.H. Ger. patent application C 59 040 IVd/12o dated Jan 29, 1945.	1.50
4157-4161	Process for producing surface-active substances. Chemische Fabrik R. Baumheier K. G. Ger. patent application dated Feb 4, 1944.	1.50
4162-4166	Process for producing sulfonated condensation products of chlorinated mineral oils. Chemische Fabrik R. Baumheier K. G. Ger. patent application C 57 992 IVd/12o dated Jan 26, 1943.	1.50
4167-4168	Process for producing viscose. Chemische Fabrik von Heyden A. G. Ger. patent application C 58 098 dated Mar 15, 1943.	$1.50
4169-4172	Process for deacidification of acid resins. "Cetefa"-Lübeck. Ger. patent application dated Jul 31, 1944.	1.50
4173-4175	Process for producing nitrochlorohydrocarbons. I. G. Farbenindustrie A. G. Ger. patent application I 68 342 dated Nov 29, 1940.	1.50
4176-4181	Process for producing antiknock motor fuels. I. G. Farbenindustrie A. G. Ger. patent application I 68 648 dated Jan 14, 1941. Incomplete.	2.50
4182-4187	Method for producing antiknock motor fuels. I. G. Farbenindustrie A. G. Ger. patent application I 68 649 dated Jan 14, 1941.	2.50
4188-4194	Process for treating lignin sulfonic acids. I. G. Farbenindustrie A.G. Ger. patent application I 68 702 IVc/12o dated Jan 20, 1941.	2.50
4195-4199	Process for producing fatty acids. I. G. Farbenindustrie A. G. Ger. patent application I 69 044 dated Mar 5, 1941.	1.50
4200-4202	Process for removing diene hydrocarbons from gas mixtures. I. G. Farbenindustrie A. G. Ger. patent application I 69 056 dated Mar 5, 1941.	1.50
4203-4213	Process for oxidizing liquid or solid hydrocarbons. I. G. Farbenindustrie A. G. Ger. patent application I 69 045 IVc/12o dated Jan 15, 1945.	3.75
4214-4219	Process for producing organic compounds containing oxygen. I. G. Farbenindustrie A. G. Ger. patent application I 69 072 dated Mar 6, 1941.	2.50
4220-4230	Process for producing high-grade motor fuels from hydrocarbon mixtures. I. G. Farbenindustrie A. G. Ger. patent application I 69 107 dated Mar 11, 1941.	3.75
4231-4236	Process for removing small quantities of hydrocyanic acid from gas mixtures containing ammonia. Bayerische Stickstoff-Werke. Ger. patent application B 204 118 IVb/12k/10 dated Oct 12, 1943.	1.50
4237-4241	Process for reducing hydrogenation catalysts. Ger. patent application B 187 734 IVd/12o dated Apr 19, 1939. Flow sheet and graphs included.	1.50

Frames	Title	Price
4242	Process for producing di-, -keto-butylether. Consortium für elektrochemische Industrie. Ger. patent application C 52 787 IVd/12o dated May 7, 1937.	$1.50
4243-4245	Process for producing tartaric acid. Chemische Fabrik Joh. A. Benckiser G.m.b.H. Ger. patent application C 57 797 IVd/12o dated Nov 20, 1941. Supplement to patent application C 56 390 IVd/12o.	1.50
4246-4247	Process for producing tartaric acid. Chemische Fabrik Joh. A. Benckiser G.m.b.H. Ger. patent application C 56 390 IVd/12o dated Mar 24, 1941. Supplement to patent application C 56 351 IVd/12o.	1.50
4248-4250	Process for producing tartaric acid. Chemische Fabrik Joh. A. Benckiser G.m.b.H. Ger. patent application C 56 351 IVd/12o dated Mar 5, 1941.	1.50
4251-4253	Process for producing ethers. Canzler, A. (Inventor). Ger. patent application C 57 494 dated Jul 13, 1942.	1.50
4254-4255	Process for producing nitramides. Canzler, A. (Inventor). Ger. patent application C 57 086 dated Jan 30, 1942.	1.50
4256-4260	Process for producing sugar derivatives. Canzler, A. (Inventor). Ger. patent application C 57 392 IVc/12o dated Jun 3, 1942.	1.50
4261-4263	Process for incomplete combustion of organic compounds. Behrens, J. (Inventor). Ger. patent application B 188 239 IVd/12o dated Aug 3, 1939. Handwritten in German script.	1.50
4264-4266	Process for producing tartaric acid. Chemische Fabrik Joh. A. Benckiser G.m.b.H. Ger. patent application C 57 185 IVd/12o dated Jun 16, 1942. Supplement to patent application C 56 351 IVd/12o (frames 4248-4250 above).	1.50
4267-4269	Process for producing mixed esters. Chemische Fabrik Joh. A. Benckiser G.m.b.H. Ger. patent application C 57 901 IVd/12o dated Dec 17, 1942.	1.50
4270-4272	Process for producing alkali metal derivatives. Chwala, August (Inventor). Ger. patent application dated Mar 21, 1945.	1.50
4273-4275	Condensation products. Canzler, A. (Inventor). Ger. patent application C 57 498 dated Jul 13, 1942.	1.50
4276-4279	Process for separating ring ketones. Boehringer, C. F. und Söhne G.m.b.H. Ger. patent application B 176 784 IVc/12o dated Dec 28, 1936.	1.50
4280-4282	Condensation products. I. G. Farbenindustrie A. G. Ger. patent application I 61 301 dated May 10, 1938.	$1.50
4283-4286	Process for producing dihalopropane and -butane. I. G. Farbenindustrie A. G. Ger. patent application I 61 246 IVd/12o dated Jul 12, 1940.	1.50
4287-4295	Continuous process for the pressure hydrogenation of coals, tars and mineral oils in the liquid phase. I. G. Farbenindustrie A. G. Ger. patent application I 75 142 dated May 26, 1943.	3.75
4296-4298	Process for producing acetaldehyde. Ger. patent application L 109 651 IVd/12o dated Nov 24, 1942.	1.50
4299-4301	Process for producing ω-halogen substituted carboxylic acids. Laske, Franz (Inventor). Ger. patent application L 107 591 IVd/12o dated Apr 20, 1942.	1.50
4302-4305	Process for the catalytic separation of water from organic compounds. Langbein-Pfanhauser Werke A. G. Ger. patent application L 104 371 dated May 22, 1941.	1.50
4306-4309	Process for oxidation of aliphatic aldehydes. Ger. patent application L 101 669 IVd/12o dated Aug 23, 1940.	1.50
4310-4313	Process for obtaining emulsifiers from mineral oils. Ger. patent application P 85 667 IVd/12o dated Feb 10, 1943.	1.50
4314-4317	Process for obtaining fatty acids or esters from mixtures which contain resins and fatty acids. Ger. patent application P 86 989 dated Nov 10, 1943.	1.50
4318-4320	Process for utilizing the cellulose waste products soluble in alkali, from the viscose process. Ger. patent application P 83 935 IVc/12o/6 dated Mar 18, 1942.	1.50
4321-4325	Process for producing alginic acids and their salts. Schering A. G. Ger. patent application Sch 126 494 dated Dec 30, 1942.	1.50
4326-4328	Process for producing acetic anhydride. Wacker, Alexander, G.m.b.H. Ger. patent application W 108 306 dated Dec 27, 1940.	1.50
4329-4333	Process for producing catalysts. Wacker, Alexander, G.m.b.H. Ger. patent application W 107 027 IVd/12o 19/03 dated Feb 23, 1940.	1.50

Frames	Title	Price
4334-4335	Process for producing aliphatic alcohols with a terminal hydroxy group and a functional group at the other end of the carbon chain. Ger. patent application dated Feb 7, 1945. Supplement to patent application H 172 942 IVd/12o.	$1.50
4336-4340	Process for producing ketones. Knoll A. G. Ger. patent application K 159 256 dated Apr 14, 1942.	1.50
4341-4342	Process for producing triphenyl stibine iodides. Kaufmann, L. (Inventor). Ger. patent application K 124 519 IVa/12o dated Mar 2, 1932. Supplement to patent application 12o 4 K 1069.50.	1.50
4343-4348	Process for producing -cyclohexyl-isopropyl methyl amine. Knoll A. G. Ger. patent application K 157 616 IVc/12o dated May 14, 1940.	1.50
4349-4351	Process for producing chemical compounds. Holl, Fritz W. (Inventor). Ger. patent application H 156 235 dated Jun 21, 1938.	1.50
4352-4354	Esters of fatty acids. Ger. patent application H 170 596 dated Jan 22, 1943.	1.50
4355-4362	Process for limiting the effect of chlorine in the continuous chlorination of hydrocarbons in the liquid phase. Rütgerswerke A. G. Ger. patent application R 107 222 IVd/12o dated Oct 17, 1941. Drawings included.	2.50
4363	Process for producing an unsaturated acetal. Wacker, Alexander G.m.b.H. Ger. patent application W 114 051 dated Oct 23, 1943. Supplement to patent application W 112 255 IVd/12o, 19/03.	1.50
4364-4367	Process for producing N-acyl compounds of high molecular weight. Canzler, A. (Inventor). Ger. patent application C 57 869 dated Dec 11, 1942.	1.50
4368-4372	Process for producing sugar derivatives. Chwala, A. (Inventor). Ger. patent application C 57 416 dated Jun 10, 1942.	1.50
4373-4375	Process for producing acrylonitrile. Consortium für Elektrochemische Industrie. Ger. patent application C 55 437 IVc/12o dated Jun 23, 1941.	1.50
4376-4381	Condensation products. Chemische Fabrik von Heyden A. G. Ger. patent application C 54 476 dated Oct 31, 1938.	2.50
4382-4385	Process for halogenating hydrocarbons. Krupp, Friedrich, A. G. Ger. patent application K 161 915 IVd/12o dated Aug 9, 1941.	1.50
4386-4388	Process for producing organic compounds. Wacker, Alexander, G.m.b.H. Ger. patent application W 114 076 dated Oct 25, 1943. Supplement to patent application W 113 374 IVb/12o.	$1.50
4389-4391	Apparatus for reactions of gases. Wacker, Alexander, G.m.b.H. Ger. patent application W 109 947 dated Nov 13, 1941. Drawings missing.	1.50
4392-4397	Process for preparing from aromatic alcohols liquid to semisolid condensation products or polymers. Licentia Patent-Verwaltungs-G.m.b.H. Ger. patent application L 106 080 IVc/12o dated Nov 29, 1941.	2.50
4398-4401	Process for halogenating hydrocarbons. Krupp, Friedrich, A. G. Ger. patent application K 161 913 IVd/12o Gr. 2/01 dated Aug 9, 1941.	1.50
4402-4411	Process for preparing condensation products. Chemische Fabrik von Heyden. Ger. patent application C 54 190 dated Jul 19, 1938. Supplement to patent application C 53 918 IVc/12g.	2.50
4412-4413	Safe process for producing and handling dichloro acetylene. Chemisches Werk Schollene G.m.b.H. Ger. patent application C 58 328 IVd/12o 19/02 dated Jun 4, 1943. Supplement to patent application C 58 257 IVd/12o.	1.50
4414-4415	Process for producing ethers. Consortium für Elektrochemische Industrie. Ger. patent application C 52 788 dated May 5, 1937.	1.50
4416-4419	Process for preparing water-soluble condensation products. Canzler, A. (Inventor). Ger. patent application C 57 839 dated Dec 7, 1942.	1.50
4420-4422	Condensation products. Canzler, A. (Inventor). Ger. patent application C 57 838 dated Dec 7, 1942.	1.50
4423-4425	Condensation products of high molecular weight. Canzler, A. (Inventor). Ger. patent application C 57 837 dated Dec 7, 1942.	1.50
4426-4438	Process for producing hydrocarbons. Ger. patent application M 151 313 dated Jul 5, 1941.	3.75
4439-4441	Process for producing keto acids. Ger. patent application K 171 745 IVd/12o, dated Jun 24, 1944.	1.50
4442-4443	Process for producing thiocyanogen compounds. Kast und Ehinger G.m.b.H. Ger. patent application K 169 593 dated Sep 11, 1943.	1.50

Frames	Title	Price
4444-4445	Process for producing 9,11-linoleic acid. Kaufmann, H. P. (Inventor). Ger. patent application K 169 879 dated Oct 21, 1943.	$1.50
4446	Process for producing seleno-urea. Kast und Ehinger G.m.b.H. Ger. patent application K 170 958 IVc/12o dated Mar 9, 1944.	1.50
4447-4448	Esterification products. Deutsche Hydrierwerke A. G. Ger. patent application D 76 811 dated Dec 11, 1937.	1.50
4449-4454	Process for producing aldehydes or ketones. Krönke, F. (Inventor). Ger. patent application K 151 505 dated Jul 12, 1938.	2.50
4455-4457	process for producing nitroparaffins. Deutsche Hydrierwerke A. G. Ger. patent application D 83 124 dated Aug 13, 1940.	1.50
4458-4459	Process for producing dicarboxylic acids. Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler. Ger. patent application D 93 179 IVd/12o dated May 2, 1944.	1.50
4460-4461	Process for producing pentaerythrite monoacetals. Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler. Ger. patent application D 88 271 IVd/12o dated Feb 21, 1945.	1.50
4462-4466	Process for producing detergents, emulsifiers, wetting and permeating agents. Ger. patent application M 149 399 dated Dec 11, 1940.	1.50
4467-4470	Process for mutual reduction and oxidation of aldehydes or ketones and alcohols. Langbein-Pfanhauser Werke A.G. Ger. patent application L 105 279 dated Sep 2, 1941.	1.50
4471-4475	Process for producing by hydrogenation of carbon monoxide chiefly such hydrocarbons which boil at higher temperatures. Metallgesellschaft A. G. Ger. patent application M 139 309 IVd/12o dated Jun 9, 1942.	1.50
4476-4481	Process for the production of catalysts to be used for obtaining liquid and solid hydrocarbons. Ger. patent application dated Nov 14, 1942.	1.50
4482-4490	Process for the pressure oxidation of hydrocarbons. Ger. patent application M 144 558 dated Mar 15, 1939.	2.50
4491-4495	Process for obtaining sulfonation products from coal and bituminous minerals. Wernicke, E. A. (Inventor). Ger. patent application W 106 775 dated Jan 15, 1940.	1.50
4496-4509	Process for obtaining organic acids. Ger. patent application M 153 195 IVd/12o dated Feb 6, 1942. Flow sheet included.	$3.75
4510-4517	Process for producing higher ethers. Henkel und Cie. Ger. patent application H 130 049 IVa/12o dated Nov 1, 1933.	1.50
4518-4522	Process for hydrocarbons by the reaction of carbon monoxide and hydrogen. Schnadt, F. (Inventor). Ger. patent application Sch 116 532 IVd/12o dated Aug 31, 1938. Drawing included.	1.50
4523	Process for producing esters of sulfuric acid. I. G. Farbenindustrie A.G. Ger. patent application I 76 953 IVd/12o dated Mar 4, 1944.	1.50
4524	Process for obtaining hydrocarbons and their derivatives. Kellwitz, K. (Inventor). Ger. patent application K 163 789 IVd/12o dated Feb 20, 1942.	1.50
4525-4532	Process for utilizing poor technical gases for syntheses. Kohle- und Eisenforschung G.m.b.H. Ger. patent application K 153 791 dated Mar 13, 1939. Supplement to patent application K 153 381 IVd/12o.	2.50
4533-4535	Production of lubricants and wetting agents or detergents. Gewerkschaft Victor. Ger. patent application G 104 168 dated Oct 2, 1941.	1.50
4536-4543	Process for separating unsaponifiable components from salts of surface-active organic sulfur-oxygen compounds. Henkel und Cie. Ger. patent application H 167 577 dated Feb 16, 1942.	2.50
4544-4548	Process for producing acetaldehyde. Hoeck, Henri Gaston Van (Inventor). Ger. patent application H 172 724 IVd dated Oct 18, 1943.	1.50
4549-4551	Improvement of tall oil resin acid. Ger. patent application H 167 356 dated Jan 22, 1942.	1.50
4552-4556	Process for producing esters which can be used as leather grease. Henkel und Cie. Ger. patent application H 170 622 dated Jan 25, 1943.	1.50
4557-4561	Decomposition of humic acids. Genningen, C. (Inventor). Ger. patent application G 101 831 IVc/12o dated Jun 8, 1940.	1.50
4562-4567	Process for producing olefins from aliphatic hydrocarbons. Gewerkschaft Victor. Ger. patent application G 102 168 dated Aug 28, 1940.	2.50

Frames	Title	Price
4568-4571	Process for the oxidizing decomposition of materials containing carbon. Gesellschaft für Kohlen Technik G.m.b.H. Ger. patent application G 101 127 dated Jan 4, 1940.	$1.50
4572-4574	Production of catalysts for the catalytic polymerization and alkylation of hydrocarbons. Gutehoffnungshütte A. G. Ger. patent application G 100 562 IVd/12o dated Aug 11, 1939.	1.50
4575-4581	Process for producing synthetic plastic materials. Ger. patent application G 99 182 dated Dec 21, 1938.	2.50
4582-4585	Process for producing mixtures containing chiefly citric acid. Weber, Otto E., Radebeul-Dresden. Ger. patent application G 95 713 IVd/12p dated Jul 27, 1940.	1.50
4586-4588	Production of liquid and solid hydrocarbons by partial combustion of methane. Gaschler, Adolf (Inventor). Ger. patent application G 104 051 dated Sep 9, 1941.	1.50
4589-4594	Process for purification of crude benzene. Gutehoffnungshütte A. G. Ger. patent application G 95 695 IVd/12r dated Jan 9, 1941.	2.50
4595-4598	Process for producing polymerization products from gaseous olefins. Gewerkschaft Victor. Ger. patent application G 93 574 dated Aug 20, 1936. Supplement to patent application G 92 035 IVc/12o.	1.50
4599-4603	Process for processing "Kogasin." Gewerkschaft Victor. Ger. patent application G 92 034 IVd/12o dated Jan 25, 1936.	1.50
4604-4606	Process for producing unsaturated alkyl chlorides. Gewerkschaft Victor. Ger. patent application G 107 331 IVd/12o dated Apr 7, 1943.	1.50
4607-4611	Process for exchanging ester radicals of esters of fatty acids of high molecular weight. Noblee und Thörl G.m.b.H. Ger. patent application St 45 740 IVd/12o dated Jun 5, 1942.	1.50
4612-4617	Process for obtaining from the seeds of the horse chestnut, saponin, fat, and grist which is open to fermentation and can be freed from the bitter principles. Merck, E. Ger. patent application dated Dec 18, 1940.	2.50
4618-4619	Process for producing butadiene. Consortium für Elektrochemische Industrie G.m.b.H. Ger. patent application C 52 529/12o dated Feb 24, 1937.	1.50
4620-4626	Process for transforming aldehydes into carboxylic acids. Ruhrchemie A.G. Ger. patent application R 111 181 dated Oct 8, 1941.	$2.50
4627-4635	Process for producing highly sulfonated hydrocarbon compounds, especially sulfur-containing mineral oil preparations, for pharmaceutical purposes. Portlandzementwerk Dotternhausen. Ger. patent application P 81 593 dated Nov 22, 1940.	2.50
4636-4639	Process for obtaining lignin from alkaline liquors. Pessi, Edoardo, S. A., Padua, Italy. Ger. patent application P 81 586 dated Nov 21, 1940.	1.50
4640-4642	Process for producing an absorption compound of aluminum hydroxide and water-soluble cellulose ethers, suitable for dosmetic and pharmaceutical purposes. Pomosin-Werke. Ger. patent application P 84 402 dated Jun 13, 1942.	1.50
4643-4644	Process for producing monoureas of aliphatic diamines. Ger. patent application P 84 484 dated Jun 26, 1942.	1.50
4645-4647	Process for producing pyromellitic acid anhydride. Ger. patent application P 86 205 IVd/12o dated May 25, 1943.	1.50
4648-4650	Process for producing solid, water-soluble aluminum acetate. Pomosin-Werke. Ger. patent application P 83 472 IVd/12o dated Dec 10, 1941.	1.50
4651-4655	Process for oxidizing paraffinic hydrocarbons. Ruhrchemie A. G. Ger. patent application R 110 978 IVd/12o dated Sep 5, 1941.	1.50
4656-4660	Process for separating isomeric mixtures of fatty acids. Ruhrchemie A. G. Ger. patent application R 112 882 IVd/12o dated May 4, 1942.	1.50
4661-4664	Process for producing lubricants. Ger. patent application R 109 307 dated Feb 10, 1941.	1.50
4665-4668	Process for dehydrating alcohols. Ruhrchemie A. G. Ger. patent application R 109 370 dated Feb 12, 1941.	1.50
4669-4673	Process for producing catalysts for the synthesis of gasoline. Ruhrchemie A. G. Ger. patent application R 95 985 dated Apr 1, 1936.	1.50
4674-4679	Process for producing oxo compounds, or their transformation products containing oxygen, from olefinic primary products of the hydrogenation of carbon monoxide. Ruhrchemie A. G. Ger. patent application R 108 107 dated Aug 5, 1942.	2.50

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4680-4684	Process for the condensation of aldehydes of high molecular weight. Ruhrchemie A. G. Ger. patent application R 108 162 dated Aug 17, 1940.	$1.50
4685-4690	Process for producing non-aging lubricants. Ruhrchemie A. G. Ger. patent application R 109198 dated Jan 24, 1941.	2.50
4691-4694	Process for improving alkali cellulose. Ger. patent application P 80 586 dated Apr 4, 1940.	1.50
4695-4702	Process for producing aliphatic chloro-, chloromercapto-, and mercapto-thio ethers. Racky, G. (Inventor). Ger. patent application R 104 535 dated Feb 14, 1939.	2.50
4703-4712	Process for producing mixtures of aliphatic carboxylic acids. Mirkische Seifen-Industrie. Ger. patent application M 135 836 IVd/12o dated Mar 25, 1939.	2.50
4713-4718	Process for producing formaldehyde by direct oxidation of methane. Ger. patent application G 107 353 IVd/12o dated Apr 9, 1943.	2.50
4719-4726	Process for producing aluminum compounds, particularly basic aluminum compounds of organic acids. Goldschmidt, Th., A. G. Ger. patent application G 108 100 IVd/12o dated Aug 30, 1943.	2.50
4727-4730	Process for producing aluminum compounds, particularly basic aluminum compounds of organic acids. Goldschmidt, Th., A. G. Ger. patent application G 108 217 dated Oct 1, 1943. Supplement to patent application G 108 100 IVd/12o.	1.50
4731-4732	Process for producing unsaturated hydrocarbons and their derivatives. Gaschler, A. (Inventor). Ger. patent application G 108 527 dated Dec 6, 1943.	1.50
4733-4736	Process for oxidizing saturated hydrocarbons of the paraffin series. Gutehoffnungshütte A. G. Ger. patent application G 108 560 dated Dec 13, 1943.	1.50
4737-4740	Process for obtaining concentrations of the accompanying substances of plant fibers, particularly green bast fibers. Gminder, Ulrich, G.m.b.H. Ger. patent application G 108 852 IVc/12o/26/01 dated Feb 11, 1944.	1.50
4741-4745	Process for producing anti-knock hydrocarbons. Gutehoffnungshütte A. G. Ger. patent application G 103 866 dated Jul 25, 1941.	1.50
4746-4753	Process for producing wax-like substances. I. G. Farbenindustrie A. G. Ger. patent application I 74 553 IVd/12o dated Mar 14, 1945.	$2.50
4754-4760	Process for producing molding materials from sulfite cellulose waste liquor. Bachmann, G. (Inventor). Ger. patent application B 194 417 dated May 28, 1941.	1.50
4761	Process for producing non-combustible, elastic substances shaped as fibers. Born, A. (Inventor). Ger. patent application B 202 281 dated Apr 20, 1943.	1.50
4762-4764	Process for producing oxidation products from fuels. Bergwerks Verband Zur Verwertung von Schutzrechten der Kohlentechnik, G.m.b.H. Ger. patent application B 200 230 dated Nov 7, 1942.	1.50
4765-4768	Process for introducing thiocyanogen into lignin sulfonic acids. Schwabe, K. (Inventor). Ger. patent application Sch 123 563 dated Nov 3, 1941. Supplement to patent application Sch 121 596 IVd/12o.	1.50
4769-4770	Production of hydrocarbons. Weissenberg, G. (Inventor). Ger. patent application dated Mar 16, 1941.	1.50
4771-4772	Process for increasing the yield of products containing oxygen in the catalytic carbon monoxide hydrogenation performed under pressure. Ruhrchemie A. G. Ger. patent application R 113 885 dated Aug 25, 1942. Supplement to patent application R 109 774 IVd/12o.	1.50
4773-4775	Process for producing mineral oil sulfonates. Portlandzementwerk Dotternhausen. Ger. patent application P 86 907 dated Oct 28, 1943.	1.50
4776-4779	Process for producing viscose in a single operation. Ger. patent application P 87 042 /12o dated Nov 22, 1943.	1.50
4780-4784	Process for sulfidizing alkali celluloses. Phrix-Werke A. G. Ger. patent application P 88 463 IVc/12o dated Jan 30, 1945.	1.50
4785-4786	Process for producing textile aids from tall oil. Ger. patent application P 86 811 dated Sep 30, 1943.	1.50
4787-4788	Process for producing tanning agents. Ger. patent application P 85 106 dated Nov 4, 1942. Supplement to patent application P 74 139 IVc/12e.	1.50
4789-4792	Processing crude tar. Ger. patent application R 110 443 dated Jun 25, 1941.	1.50

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4793-4795	Process for purifying contaminated benzoic acid. I. G. Farbenindustrie A. G. Ger. patent application I 70 824 dated Nov 7, 1941.	$1.50
4796-4801	Process for producing surface-active agents to be used in the separation of all kinds of oil emulsions. Ruhrol G.m.b.H. Ger. patent application R 117 751 dated Dec 15, 1943.	2.50
4802-4804	Process for preparing from paraffins, petrolatum- or lubricant-like products. Schaffgotsch-Benzin G.m.b.H. Ger. patent application Sch 124 611 dated Apr 4, 1942.	1.50
4805-4806	Process for starting the operation with catalysts to be used in the hydrogenation of carbon monoxide. Steinkohlenbergwerke Rheinpreussen. Ger. patent application St 63 730 dated Dec 27, 1943. Supplement to patent applications St 63 388 and 63 406.	1.50
4807-4815	Highly active iron catalysts for the hydrogenation of carbon monoxide. Ruhrchemie A. G. Ger. patent application R 106 554 dated Dec 9, 1939.	2.50
4816-4818	Process for obtaining chiefly Diesel oils in the hydrogenation of carbon monoxide. Ruhrchemie A. G. Ger. patent application R 107 891 dated Jul 3, 1940.	1.50
4819-4821	Process for the transformation of naphthalene, hydronaphthalene or methylated naphthalenes. Ger. patent application R 109 028 dated Dec 27, 1940.	1.50
4822-4824	Process for producing pure olefins. Ruhrchemie A. G. Ger. patent application R 109 144 dated Jan 16, 1941.	1.50
4825-4836	Process for separating acetylene from gas mixtures. Ruhrchemie A. G. Ger. patent application R 95 631 IVd/12o dated Aug 15, 1940. Drawing included.	3.75
4837-4838	Regneration apparatus for performing reactions which proceed at high temperatures. Ruhrchemie A. G. Ger. patent application R 93 078 dated Apr 10, 1935. Supplement to patent application R 92 891 IVc/12o, 1.	1.50
4839-4842	Process for regenerating catalysts used in gasoline synthesis. Ruhrchemie A. G. Ger. patent application R 97 521 dated Oct 6, 1936. Supplement to patent application R 97 394 IVd/12o.	1.50
4843-4855	Process for producing hydrocarbons of high molecular weight. Ruhrchemie A. G. Ger. patent application R 97 688 IVd/12o dated Mar 8, 1939. Supplement to patent application R 94 081 IVd/12o.	3.75
4856-4860	Process for the catalytic production of unsaturated gaseous hydrocarbons by reduction of carbon monoxide. Ruhrchemie A. G. Ger. patent application R 104 584 dated Feb 20, 1939.	1.50
4861-4864	Process for producing an anti-knock motor fuel. Ruhrchemie A. G. Ger. patent application R 102 106 dated Apr 16, 1938.	1.50
4865-4868	Process for producing hydrocarbons of high molecular weight. Ruhrchemie A. G. Ger. patent application R 95 051 IVd/12o dated Mar 27, 1939.	1.50
4869-4872	Process for producing pure carbamic acids or amino carbamic acids. Ger. patent application P 82 163. IVc/12o dated Mar 13, 1941.	1.50
4873-4877	Process for rendering cellulose capable of swelling. Nacke, K. (Inventor). Ger. patent application N 46 930 dated Jul 19, 1943.	1.50
4878-4882	Process for oxidizing synthetic paraffins. Ruhrchemie A. G. Ger. patent application R 108 930 dated Dec 9, 1940.	1.50
4883-4887	Process for obtaining bituminous products. Rhein-Chemie G.m.b.H. Ger. patent application R 114 866 IVd/12o dated Dec 11, 1942.	1.50
4888-4889	Production of unsaturated chlorohydrocarbons having 4 carbon atoms. Ger. patent application R 101 214 dated Jan 6, 1938. Supplement to patent applications R 99 893 IVc/12o and 100 165 IVc/12o.	
4890-4893	Process for producing, from decahydro naphthalene, decahydro naphthol and other hydroxy compounds. Deutsche Hydrierwerke A. G. Ger. patent application D 90 311 IVc/12o dated Mar 20, 1943.	1.50
4894-4896	Process for producing unsaturated hydrocarbons and formic acid. Consortium für Elektrochemische Industrie G.m.b.H. Ger. patent application C 55 672 dated Mar 1, 1940.	1.50
4897-4902	Process for producing butadiene from formates of butylene glycols. Consortium für Elektrochemische Industrie G.m.b.H. Ger. patent application C 55 671 dated Mar 1, 1940. Supplement to patent application C 54 973 IVd/12o.	2.50
4903-4905	Process for producing water-solvable substituted aliphatic-aromatic sulfonic acids. Chemische Fabrik R. Baumheier K. G. Ger. patent application C 56 415 dated Apr 4, 1941.	1.50

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4906-4915	Process for sulfonating fatty acids. Chemische Fabrik R. Baumheier K. G. Ger. patent application C 56 222 IVd/12o dated Dec 30, 1940.	$2.50
4916-4925	Process for deparaffining hydrocarbons. I. G. Farbenindustrie A. G. Ger. patent application I 75 994 IVd/12o dated Oct 11, 1943. Drawing included.	2.50
4926-4927	Process for producing coal pastes for pressure hydrogenation. I. G. Farbenindustrie A. G. Ger. patent application I 75 883 dated Sep 16, 1943. Supplement to patent application I 69 002 IVd/12o.	1.50
4928-4931	Process for purifying lactic acid. Boehringer, C. H., Sohn. Ger. patent application B 195 565 dated Sep 20, 1941	1.50
4932-4934	Production of benzene carboxylic acids. Bergwerks Verband Zur Verwertung Von Schutzrechten der Kohlentechnik, G.m.b.H. Ger. patent application B 199 644 IVd/12o dated Sep 17, 1942.	1.50
4935-4937	Process for producing an ester of phosphoric acid which contains iodine. Chemische Werke Albert. Ger. patent application C 56 050 dated Oct 14, 1940. Supplement to patent application C 53 742 IVd/12o.	1.50
4938-4949	Process for producing water-soluble condensation products. Chemische Fabrik R. Baumheier K. G. Ger. patent application C 53 852 dated Mar 28, 1938.	1.50
4950-4951	Process for producing glycerol. Claasz, M. (Inventor) Ger. patent application C 56 044 IVd/12o dated Oct 11, 1940.	1.50
4952-4954	Process for producing tartaric acid. Chemische Fabrik Joh. A. Benckiser G.m.b.H. Ger. patent application C 58 746 IVd/12o dated Mar 6, 1945.	1.50
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4957-4962	Process for preparing addition products from dienes and substances of the maleic anhydride type. Flaig, W. (Inventor). Ger. patent application F 93 253 IVc/12o dated Jan 30, 1943.	2.50
4963-4964	Process for precipitating cellulose triacetate from the acetylating solution. Deutsche Acetat-Kunstseiden A. G. "Rhodiaseta." Ger. patent application D 89 665 dated Jan 9, 1943.	1.50
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4968-4972	Processing sulfonation products. Dreiringwerke K. G. Ger. patent application D 89 725 IVd/12o dated Jan 15, 1943.	$1.50
4973-4976	Process for producing highly anti-knock motor fuels. Ger. patent application B 202 816 dated Jun 1, 1943.	1.50
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4983-4984	Process for producing sulfonates. Helberger, J. H. (Inventor). Ger. patent application H 164 231 IVd/12o dated Jan 8, 1941.	1.50
4985-4989	Process for producing the salts of dicarboxylic acid or dicarboxylic acids. Henkel und Cie. Ger. patent application H 168 601 dated Jun 5, 1942. Supplement to patent application H 162 767 IVd/12o.	1.50
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5026-5028	Process for producing higher hydrocarbons by catalytic hydrogenation of oxides of carbon. Chemische Werke Essener Steinkohle A. G. Ger. patent application C 57 060 IVd/12o dated Jan 26, 1942. Supplement to patent application C 56 917 IVd/12o.	1.50
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